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NOTES

FROM THE

ROYAL BOTANIC GARDEN,

EDINBURGH.

VOL. XIII.

Including Numbers LXI-LXV.

1920-1922.

With Plates CLXX-CLXXIX, and One Figure in the Text.

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THE ROYAL BOTANIC GARDEN, EDINBURGH.

THE Royal Botanic Garden, Edinburgh, is one of three Gardens maintained by the State in the United Kingdom, the others being the Royal Gardens at Kew in England, and the Glasnevin Garden at Dublin in Ireland. It occupies an unequally-sided quadrilateral area of 57.648 acres (bounded upon all sides by public roads and dwelling-houses) on the north side of Edinburgh—about a mile from the shore of the Firth of Forth. Its highest point, at Inverleith House—the official residence of the Regius Keeper of the Garden—towards the north-west, is 109 feet above sea-level, and thence the ground falls away on all sides. The lowest point —a depression 48 feet above sea level, with an east and west trend through the middle of the Garden—is the site of an old bog, and the ground rises again to the south of the depression. The surface soil is generally alluvial sand resting on clay at considerable depth. In the lower part of the area the clay comes to the surface.

There are two entrances to the grounds—one upon the east side from Inverleith Row into the **Garden**, the other upon the west side from Arboretum Road into the **Arboretum**. The entrance to the **Laboratories, Lecture Halls, Library**, and to the **Office** for Garden business is from Inverleith Row.

The **Garden** is open daily from **9 a.m.** on **Week-days** and from **11 a.m.** on **Sundays** until sunset.

The **Plant-Houses** are open from **1 p.m.** until **5 p.m.**, or until sunset if this be earlier.

The **Museum** is open on **Week-days** from **9 a.m.** until **5 p.m.** and on **Sundays** from **1 p.m.** until **5 p.m.**

The **Herbarium** is open on **Week-days** from **9 a.m.** until **5 p.m.**, excepting **Saturday**, when it is open until **1 p.m.**

The **Library** is open on **Week-days** from **9 a.m.** until **5 p.m.**, excepting **Saturday**, when it is open until **1 p.m.**

The **Office** for transaction of business with the Public and with Tradesmen is open on **Week-days** from **9 a.m.** until **5 p.m.**, excepting **Saturday**, when it is open until **1 p.m.**

[Notes R.B.G., Edin., April 1922.]

Staff of the Royal Botanic Garden, Edinburgh, at April 1922.

ESTABLISHMENT.

Regius Keeper	William Wright Smith, M.A., F.L.S., F.R.S.E.
Assistant Keeper	Vacant
Assistant in Herbarium	William Edgar Evans, B.Sc.
Assistant in Laboratory	Matthew Young Orr
Assistant in Library	James Todd Johnstone, M.A., B.Sc.
Assistant in Museum	Harry Frank Tagg, F.L.S.
Assistant in Studio	Robert Moyes Adam
Head Gardener	Robert Lewis Harrow, F.R.H.S.
Plant Propagator	Laurence Baxter Stewart
Typist	Jean Brockie
Do.	Elizabeth Murdison Reid
Medical Officer	Disney Cran, M.D.

Assistant Head Gardener	David Ramsay Oliver
Foreman of Arboretum	Charles Lamont
Foreman of Glass Department	James John Campbell
Foreman of Herbaceous Department	Alexander M'Cutcheon

RULES for the Royal Botanic Garden and Arboretum in connection with the Regulations prescribed by "The Parks Regulation Act, 1872."

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1. No unauthorised Person may ride or drive in this Garden or in the Arboretum, and no Wheelbarrow, Truck, Bath-chair, Perambulator, Cycle, or other Vehicle or Machine, is allowed to enter, except with the written permission of the Keeper. Children under ten years of age are not admitted unless accompanied by a Parent or suitable Guardian.

2. No Horses, Cattle, Sheep or Pigs are allowed to enter.

3. No Dogs are admitted.

4. No Bags, Baskets, or Parcels, no Flowers, and no implements for games may be brought in; Artists and Photographers may not bring in their Apparatus without written permission from the Keeper.

NOTE.—*The foregoing Rules shall not apply to persons going to or leaving Inverleith House by the road leading from the Arboretum Road Gate to the House.*

5. Visitors are to enter and leave the Plant-Houses by the Doors according to the Notices affixed thereon.

6. Smoking is not allowed in the Plant-Houses.

7. No Person shall touch the Plants or Flowers.

8. Picnics and luncheon parties are not allowed.

9. No unauthorised Person shall Drill or practise Military Evolutions or use Arms or play any Game or Music, or practise Gymnastics, or sell or let any Commodity.

10. No unauthorised Public Address may be delivered in the Garden or Arboretum, No Performance or Representation either spoken or in dumb show shall be given in any part of the Garden or Arboretum, unless by permission of the Commissioners of His Majesty's Works and Public Buildings. No Person shall use any obscene, indecent, or blasphemous words, expressions, or

gestures, or do any act calculated to provoke a breach of the Peace, in the course of, or in connexion with, any speech, address, performance, recitation, or representation. No money shall be solicited or collected in connexion with any performance, recitation, or representation, except by permission of the Commissioners of His Majesty's Works and Public Buildings.

11. Large parties must be broken up to prevent crowding.

12. Climbing the Trees, Railings or Fences is forbidden.

13. Birds'-nesting, and taking, destroying, or injuring Birds or Animals are forbidden.

14. The distribution of Handbills, Advertisements, and other Papers by the Public is forbidden.

Dated the 28th Day of April, 1904.

Sealed with the Common Seal of the Commissioners of His Majesty's Works and Public Buildings.

SCHOMBERG K. M'DONNELL,
Secretary.

Seal.

Historic Notice.

In the year 1670 a small portion of ground, known as St. Ann's Yards, lying to the south of Holyrood House, and usually let to market gardeners by the Hereditary Keeper of Holyrood House, was occupied by two eminent Edinburgh physicians, **Andrew Balfour** and **Robert Sibbald** for the making of a Physic Garden, and **James Sutherland** was appointed to the "Care of the Garden." This was the foundation of the Royal Botanic Garden of Edinburgh, which is therefore, after that of Oxford (founded in 1632), the oldest in Great Britain. The Garden was stocked with plants from the private Garden of Dr Andrew Balfour, in which for some years he had been accumulating medicinal plants, and also in great measure from that at Livingston in West Lothian, the laird of which, Patrick Murray, was much interested in the growing of useful plants. Shortly thereafter, but at what precise date has not yet been ascertained, Sutherland became custodian of the Royal Garden, which lay on the north side of the Palace, and it became a Physic Garden for instruction, whilst the original plot in St. Ann's Yards was, apparently, given up.

In 1676 the same physicians acquired from the Town Council of Edinburgh a lease of the Garden of Trinity Hospital and adjacent ground for the purpose of a Physic Garden in addition to the Garden already existing at Holyrood, and they appointed the same James Sutherland (1639?–1719) to be "Intendant" of this Garden. The site of this Garden, which for convenience of reference may be called the Town's Botanic Garden, was the ground lying between the base of that portion of the Calton Hill upon which the prison is built and the North Bridge, and it is now occupied by a portion of the Waverley Station of the North British Railway. The name Physic Garden attached to a street in the vicinity is a reminiscence of the existence of the Garden at this spot.

About 1702 another Botanic Garden was established in Edinburgh in the ground immediately adjacent to the College Buildings, apparently on the site of the present South College Street. This was the College Garden, and of it James Sutherland became also custodian.

Thus in the early years of the eighteenth century there were

in Edinburgh three distinct Botanic or Physic Gardens—one at Holyrood, the Royal Garden; one around Trinity Hospital, The Town's Garden; and one beside the College, the College Garden—all under the care of James Sutherland.

Sutherland from the first made use of the Royal Garden for giving "instruction in Botany to the Lieges," and received a royal warrant appointing him Botanist to the King in Scotland, and empowering him to "set up a Profession of Botany" in this Garden. When the Town's Garden was created the Town Council appointed him to lecture on Botany as Professor in the Town's College, now the University of Edinburgh. In 1683 he published his "Hortus Medicus Edinburgensis, or a Catalogue of the Plants in the Physical Garden at Edinburgh," from which and from other published notices we learn that between two and three thousand plants were in cultivation. There are no data available from which to determine how these plants were distributed between the several Gardens at the date of publication of Sutherland's catalogue.

In 1706 Sutherland resigned the care of the Town's Garden and the College Garden as well as his Professorship in the University, but, remaining King's Botanist, he retained the care of the Royal Garden at Holyrood. Charles Preston (1660–1711) was appointed his successor by the Town Council, and there were thus established rival Gardens and rival Professors of Botany in Edinburgh. Charles Preston was succeeded in 1712 in his offices by his brother George Preston (1659–1749). Neither of the Prestons had ever the care of the Royal Garden.

Sutherland's appointment as King's Botanist, Keeper of the Royal Garden, and Regius Profcssor of Botany was held during the pleasure of the Sovereign, and on the death of Queen Anne in 1714 he was not continued in office by George I.

In 1715 **William Arthur** (1680–1716) received a commission as successor to Sutherland, but as he was implicated in an unsuccessful Jacobite plot to seize the Castle, he did not hold the office long.

He was succeeded in 1716 by **Charles Alston** (1685–1760).

In 1724 the College Garden, having fallen into disorder, was turned to other uses; and in 1729, George Preston having retired, the Town Council appointed, as his successor in the charge of the Town's Garden and as Professor of Botany in the Univers-

ity, Charles Alston, who as King's Botanist had already the charge of the Royal Garden and was Regius Professor of Botany. Through him, after separation for a quarter of a century, the Royal Garden and the Town's Garden were again combined under one Keeper, and the Regius Professorship of Botany and the University Professorship were similarly united. They have so continued to the present time.

In 1763, the Royal Garden and the Town's Garden proving too small and otherwise unsatisfactory, **John Hope** (1725–1786), who had succeeded Alston in his offices in 1761, proposed a transference of the two to a more congenial site in which they could be combined. At first it was intended to secure ground to the south of George Watson's Hospital—the area upon which much of the present Royal Infirmary is built—but this not being possible, five acres of ground to the north side of Leith Walk, below the site now occupied by Haddington Place, were chosen. As Hope proposed to transfer the collections in the Royal Garden to the new Garden he was able to secure the support of the Treasury to his scheme, and the selected ground was leased in name of the Barons of Exchequer. At the same time the Town Council agreed to contribute £25 annually to the support of the Garden, the sum being the amount of rent expected from the letting of the old Town's Garden. The plants from both Gardens were transferred to the ground at Leith Walk, and from this date there has been only one Botanic Garden in Edinburgh. The site thus secured for the Garden proved, however, only a temporary one.

Daniel Rutherford (1749–1819), who in 1786 succeeded Hope in his offices, cast about him for a spot in which more ground would be available for the extension of the Garden; and eventually in 1815 nine and a half acres of the land lying to the east of Holyrood Palace, and forming the ground of Belleville or Clockmill, was fixed upon as a site. This selection gave rise to controversy, which was prolonged, and Rutherford died before any arrangements for the transference of the Garden had been made.

Robert Graham (1786–1845), his successor, appointed in 1820, preferred the more open site of the Inverleith property which the Garden now occupies, and fourteen acres of the Field

or Park of Inverleith, known as Broompark or Quacaplesink, were purchased by the Barons of Exchequer from Mr James Rocheid, its owner, in 1820, the lease of the Leith Walk Ground being sold. By 1823 all the plants had been transferred to the new Garden.

In 1858, during the Keepership of **John Hutton Balfour** (1808–1884), who succeeded Graham in 1845, a further addition, by purchase from the proprietor of Inverleith, of a narrow belt of two and a half acres was made to the Garden on the west side; and in 1865 the Caledonian Horticultural Society having resigned to the Crown its lease of the ten acres of adjoining ground which it had occupied since 1824 as an experimental Garden, this ground was also made part of the Botanic Garden. Finally the present area of the Garden was completed in 1876, when the Town Council purchased from the Fettes Trustees twenty-seven and three-quarter acres of Inverleith property on the west side of the Garden and transferred it to the Crown for the purpose of making an Arboretum in connection with the Garden; the Crown at the same time purchased Inverleith House and two and a half acres of additional ground.

In 1879, **Alexander Dickson** (1836–1887) became Queen's Botanist, Regius Keeper and Professor, and held these appointments until his death in 1887. During his term of office the Arboretum was opened to the public.

He was succeeded by **Sir Isaac Bayley Balfour** (1853–), during whose term of office the Botanic Garden reached its present extended development as a centre of botanical and horticultural research and instruction. In the necessary re-arrangements the outstanding features have been the removal of the dividing wall between the Arboretum and the Botanic Garden, the laying out of the Arboretum according to the various genera of trees and shrubs, the formation of a noteworthy rock garden and the extension of a herbaceous border along the North side of the Garden. The plant-houses have in many cases been re-built and largely added to. Complete reorganisation of the laboratories and Garden offices with additional accommodation and equipment has permitted of the establishment of a botanical school which has attracted and continues to attract many research workers and students of Botany and Horticulture.

Regius Keepers (R.K.)
from the date of
Foundation of the Garden.

JAMES SUTHERLAND . .	Born 1639? R.K. 12th January, 1699.* Not confirmed, 1714. Died 24th June, 1719.
WILLIAM ARTHUR . .	Born September, 1680. R.K. 10th May, 1715. Died 1716.
CHARLES ALSTON . .	Born 24th October, 1685. R.K. 30th June, 1716. Died 22nd November, 1760.
JOHN HOPE . . .	Born 10th May, 1725. R.K. 13th April, 1761. Died 10th November, 1786.
DANIEL RUTHERFORD . .	Born 3rd November, 1749. R.K. 20th December, 1786. Died 15th December, 1819.
ROBERT GRAHAM . . .	Born 7th December, 1786. R.K. 31st January, 1820. Died 7th August, 1845.
JOHN HUTTON BALFOUR . .	Born 15th September, 1808. R.K. 8th November, 1845. Retired, 1880. Died 11th February. 1884.
ALEXANDER DICKSON . .	Born 21st February, 1836. R.K. 28th April, 1880. Died 30th December, 1887.
ISAAC BAYLEY BALFOUR . .	Born 31st March, 1853. R.K. 5th April, 1888. Retired, 5th April, 1922.
WILLIAM WRIGHT SMITH .	Born 2nd February, 1875. R.K. 21st April, 1922.

* This is the date of a Royal Warrant from William III., and no earlier one has been found.

Principal Gardeners (P.G.) from the Year 1756.

(The names of those preceding Williamson are not yet known.)

JOHN WILLIAMSON . .	P.G. 1756? Died September, 1780.
MALCOLM M'COIG . .	P.G. 1st January, 1782? Died 25th February, 1789.
ROBERT MENZIES . . .	P.G. 1st October, 1789. Died 22nd January, 1800.
JOHN MACKAY . . .	Born 25th December, 1772. P.G. February, 1800. Died 14th April, 1802.
GEORGE DON	Born October, 1764? P.G. 1st Octoer, 1802. Resigned 31st December, 1806. Died 15th January, 1814.
THOMAS SOMMERVILLE . .	Born 1783? P.G. 1807? Died 17th March, 1810.
WILLIAM M'NAB . . .	Born 12th August, 1780. P.G. April 1810. Died 1st December, 1848.
JAMES M'NAB . . .	Born 25th April, 1810. P.G. 1st January, 1849. Died 19th November, 1878.
JOHN SADLER	Born 3rd February, 1837. P.G. 13th January, 1879. Died 9th December, 1882.
ROBERT LINDSAY . . .	Born 7th May, 1846. P.G. 3rd March, 1883. Retired 31st March, 1896. Died 24th September, 1913.
ADAM DEWAR RICHARDSON .	Born 12th September, 1857. P.G. 1st April, 1896. Resigned 31st May, 1902.
ROBERT LEWIS HARROW .	Born 26th March, 1867. P.G. 1st June, 1902.

Features of the Garden.

THE method through which the Garden was built up by successive additions resulted in an absence of combination between its several parts, in great measure a consequence of want of adequate funds to make the necessary alterations in the grounds. During the past thirty-two years, in which the Garden has been wholly under the administration of the Commissioners of H.M. Works, the bringing about of this combination has been in progress. The work is not yet completed, and the Plan of the Garden which is attached to this sketch shows the area of the Garden as it is laid out at this date—April 1922. Future editions will show further changes as the work of reconstruction proceeds.

From its foundation the Botanic Garden has been devoted to the teaching of Botany, and its usefulness in this respect has determined the laying out of its area.

Herbaceous Garden.—A considerable space is occupied by a collection of herbaceous plants arranged for study in natural orders.

Rock Garden.—There is an extensive rockwork upon which alpine and rarer herbaceous plants are cultivated.

Arboretum.—The whole of the western area of the Garden is in process of arrangement as an Arboretum of trees and shrubs, and the positions of some of the chief genera are indicated on the plan. The Coniferæ are now placed in the ground adjacent to the Rock Garden.

Herbaceous Border.—Along the North Boundary of the Arboretum a mixed Herbaceous Border has been placed.

The **Plant-Houses** are still in process of reconstruction. So far as they have been rearranged at the present time they consist of a long range to the north of the herbaceous collection, composed of a Central Green-house **(C)**, from the sides of which two Corridors run east and west. In the Entrance Porch **(D)** to the Central Green-house is a collection of Insectivorous Plants. From the Eastern Corridor two houses project to the south—one **(A)** occupied by plants of Dry Regions, the other **(B)** containing

Economic Plants of both Tropical and Temperate Regions. Ending the Corridor is a house **(AA)** occupied by Rhododendrons and other Temperate Shrubs and Trees; opening from it are houses **(BB** and **CC)** in which an indoor rockery has been built for Rock Plants which do not thrive in the open. To the south side of the Western Corridor are attached two houses—one **(E)** for Orchids and one **(F)** for Plants of Tropical and Warm Regions. The western end of the Corridor opens into a domed house **(G)** for Ferns of Tropical Regions which are planted out, and attached to it are two houses running southwards, one of which **(H)** occupied by Tropical Plants, and the other **(I)** is used for Heaths and Hardwooded Plants. From the northern wing of this domed house opens a house **(J)** devoted to monocotylous Plants of Tropical and Warm Regions, specially Aroids, Scitamineæ, Liliaceæ, and Amaryllidaceæ. Out of this opens the house **(K)** for Bromeliads; and in another house **(L)** opening from this are Pitcher Plants. Behind the western end of the Front Range there is a Temperate House **(M)** for Palms, Tree-Ferns, and Coniferæ, and a Palm-House **(N).**

Adjoining Inverleith Row is a group of buildings including the **Museum (O)**, the **Laboratories (P)**, the **Lecture Hall (Q)**, the **Library (R)**, and the **Office (Y)**, for transaction of business with the public.

The **Museum** contains a series of exhibits illustrating the form and life-history of plants, and these are arranged so as to facilitate their use in teaching.

The **Library** contains over sixteen thousand volumes. The leading botanical and horticultural periodicals are taken and may be consulted like the other books by the public. Books are not lent from the Library.

Herbarium.—In the southern portion of the Garden is the Herbarium **(S)**. It contains a fair representation of the Floras of the world.

Ladies' Cloak-Rooms are at **(T)** and **(T)**. **Gentlemen's Lavatories** will be found at **(V)** and **(V)**.

From the higher ground of the Arboretum—at the point marked **(X)** on the plan—a fine panoramic view of the City of Edinburgh, flanked on the east by Arthur's Seat, and on the west by the Pentland Hills, is obtained.

Teaching in the Garden.

In the year 1892 the Board of Agriculture, then recently established in England, assigned a small grant to the Royal Botanic Garden towards the institution of a Course of Instruction in the Sciences underlying the Practice of Horticulture and Forestry for the benefit of young men and women desiring to become Gardeners and Foresters. The fact deserves record, because it marks the introduction in Scotland of a systematised effort to provide scientific instruction to practical men in Gardening and Forestry.

The Course of Instruction has been carried on since. The following schedule—copies of which may be obtained by application to the Regius Keeper—indicates the terms upon which young men and women are at present admitted to the Course :—

Admission of Probationers.

1. The First Commissioner of His Majesty's Works is willing to consider applications from young men and women intending to become Gardeners or Foresters who may wish to serve for a period in the Royal Botanic Garden, Edinburgh.

2. The number of young men and women who can be so admitted is limited.

3. Such entrants will be in the position of Probationers, as a special class in the service of the Garden. Their work will be such as may be assigned to them, and they will work under all the regulations in force in the Garden.

4. Applicants must be unmarried and not over 25 years of age.

5. Each Applicant must furnish a medical certificate of fitness and a recommendation and certificate of character from a person of position to whom the Applicant is well known, and if the Applicant is or has been previously in a situation, a certificate from the present or last employer must be forwarded. Applicants who have had practical experience in Gardening or Forestry must state the amount of this and also if they have had experience of cultivation of plants under Glass.

6. Probationers will have the opportunity of attending a Course of Instruction in the Sciences underlying the practice and

the principles of Horticulture and Forestry free of charge, and they must attend the course, and also use the Library and Reading Room of the Garden. The subjects of Instruction, which are arranged in a curriculum extending over from two and a half to three years, are :—Botany, Chemistry, Entomology, Geology, Meteorology, Physics, Surveying and Mensuration, Field Engineering, Bookkeeping, Horticulture, and Forestry, and these are taught practically as far as possible.

7. At the conclusion of the Course of Instruction the Probationer will in ordinary course give place to a new entrant.

8. Any Probationer who does not show satisfactory progress in studies, or who does not give satisfaction otherwise, will be removed.

9. A grant in aid (subsistence allowance) will be given to each Probationer. The amount given to a Probationer at admission will depend upon his or her age, experience and capacity. The minimum will be at the rate of ten shillings a week, and the maximum at the rate of twenty-one shillings a week. In addition there is at this date (1922) a war-bonus. Probationers who receive at entrance less than the maximum may, after admission, receive increments in relation to fitness and merit alike in the work of the Garden and in the Course of Instruction.

10. Holiday leave to the amount in all of eight working days in the year, in addition to Christmas Day, New Year's Day, Victoria Day, Spring and Autumn Holidays, is allowed after six months' service.

11. Probationers may be called upon to work on Sundays, and will receive remuneration for such work on a recognised scale.

12. Men Probationers will wear when at work a grey flannel shirt with turn-over collar of the same material, and a blue serge suit of clothes; in the Glass and Herbaceous Departments an apron after pattern at the Garden must be worn.

13. Applicants must distinctly understand that the times of duty of Probationers are such as may be necessary, that admission as a Probationer is only an ordinary weekly hiring subject to a week's notice from any day, and subject to instant dismissal in case of misconduct, with subsistence allowance up to date of dismissal only, and does not entitle to any superannuation or to any compassionate or other allowance at the termination thereof,

excepting such allowance or gratuity as might be awarded under the Superannuation Act, 1887 (Secs. 1 and 4), or any Act or Acts amending the same. Further, in the event of any injury happening to a Probationer in respect of which compensation would be payable under the Workmen's Compensation Act, 1906, any such pay which may be granted will be inclusive of such compensation payable under the Act in question, and an amount equivalent to such compensation will be deducted from any payment to dependants should the injury terminate fatally.

14. Young men or women desiring admission as Probationers must fill up, in their own handwriting, the form below, and return this paper addressed to

THE REGIUS KEEPER,
ROYAL BOTANIC GARDEN,
EDINBURGH.

15. Applicants will be informed if their names* have been entered for admission, and on a vacancy occurring will receive notice thereof. Should there be no vacancy within six months from the date of application, it must be renewed if the Applicant still desires to work as a Probationer in the Royal Botanic Garden. If not renewed, the applicant's name will be removed from the waiting list.

16. The First Commissioner desires to impress upon applicants that he grants this privilege in the expectation that Probationers will earnestly endeavour to make use of and profit by the opportunities of acquiring knowledge placed within their reach, and will recognise that it is incumbent upon them at the same time to perform with zeal the duties assigned to them.

Form to be filled up by Applicants for Admission as Probationers in the Royal Botanic Garden, Edinburgh.

Name of Applicant
Address
Date of Birth
Birthplace
Forester or Gardener
Name and address of present (or last) employer
Length of time in present situation

Previous situations and length of time in each (Gardeners to state amount of their experience in cultivation of plants under Glass)

*Signature of Applicant*_____

*Date*_____

Lectures to the Public.

The Regius Keeper from time to time gives lectures which are open to the public.

Research.

The **Laboratories** are open to anyone desirous of undertaking Botanical Research.

Specimens for Private Study.

Specimens for private study are supplied, as far as the resources of the Garden will permit, to visitors, teachers, and students who make written application to the Regius Keeper. Application forms may be obtained at the office of the Garden.

Plants and Seeds are not Sold from the Garden.

Publications.

In 1900 appeared the first number of *Notes from the Royal Botanic Garden, Edinburgh,* for the purpose of publishing reports upon the condition and progress of the Garden, records of scientific investigations carried on in the Garden, and notices of matters of interest relating to plant-life which have come under the observation of the Staff. The *Notes* are available in exchange for publications of kindred institutions, and are on sale at the gates of the Garden and may be purchased either directly or through any Bookseller from H.M. Stationery Office (Scottish Branch), 23 Forth Street, Edinburgh. The parts are not issued at fixed periods. Thirteen volumes have been completed.

A short descriptive *Sketch of the Garden* may be purchased at the gates.

A **Seed List** containing the names of the plants cultivated from which seeds have been collected during the year is published in December. The seeds are available for exchange.

Botanical Department
of the
University of Edinburgh.

DURING nearly two centuries the offices of Regius Keeper of the Royal Botanic Garden and Professor of Botany in the University of Edinburgh have been held by the same person, and it has become the custom that the students of the University come to the Garden for instruction in Botany. The whole work of the Botanical Department of the University is carried out in the Garden by the University Staff, which at this date is constituted as follows :—

Professor of Botany . . .	William Wright Smith, M.A., F.L.S., F.R.S.E.
Assistant and Lecturer on Botany	James Robert Matthews, M.A., F.L.S.
Assistant and Lecturer on Forest Botany	James Lindsay Salmond Smith, M.A., B.Sc.
Assistant and Lecturer on Mycology	Malcolm Wilson, D.Sc., F.L.S., F.R.S.E.
Assistant and Lecturer on Plant Physiology	Robert James Douglas Graham, M.A., D.Sc.
Assistant and Tutor in Botany	Vacant
Lecturer on Indian Forest Trees	Sir George Watt, C.I.E., LL.D.

Enumeration of Visitors to the Royal Botanic Garden, Edinburgh, during the Years 1889-1921.

On the 1st of April 1889, the control of the Royal Botanic Garden, Edinburgh, was vested in the Commissioners of His Majesty's Works, and the Garden became subject to the "Act for the Regulation of the Royal Parks and Gardens, 1872." From the date specified the Garden has been opened to the public on Sundays, and also for an extended period on Week-days. The table below shows the number of visitors to the Garden on Sundays and Week-days respectively during the thirty-three years which have elapsed since the Garden was transferred to the Commissioners of His Majesty's Works :—

Year.	Total in Year.	Total on Sundays.	Largest Number on a Sunday.	Smallest Number on a Sunday.	Total on Week Days.	Largest Number on a Week Day.	Smallest Number on a Week Day.
*1889 ...	368,219	187,457	13,935	129	180,762	3,834	50
1890 ...	446,540	216,345	11,262	91	230,195	4,032	95
1891 ...	454,083	220,543	9,445	340	233,540	3,228	76
1892 ...	437,205	218,233	13,581	149	218,972	2,666	43
1893 ...	531,232	271,893	12,860	45	259,339	3,107	40
1894 ...	526,948	268,793	13,515	68	258,155	3,153	28
1895 ...	516,608	264,497	15,227	127	252,111	5,292	26
1896 ...	516,407	296,576	13,517	527	219,831	3,825	30
1897 ...	475,210	271,730	16,001	74	203,480	3,153	20
1898 ...	443,289	258,449	12,840	123	184,790	3,234	39
1899 ...	461,686	259,424	15,161	105	202,262	2,758	30
1900 ...	561,359	324,856	17,700	268	236,503	3,667	53
1901 ...	586,461	339,229	19,256	258	247,232	4,627	45
1902 ...	522,363	295,892	15,561	165	226,471	5,461	60
1903 ...	606,184	355,310	19,583	135	250,874	4,202	41
1904 ...	639,066	367,290	20,719	374	271,776	3,564	42
1905 ...	584,546	330,995	19,859	100	253,551	2,708	60
1906 ...	699,558	394,030	21,959	84	305,528	3,760	44
1907 ...	674,208	422,899	25,601	708	251,309	3,365	40
1908 ...	585,171	342,106	20,549	570	243,065	2,898	39
1909 ...	683,243	394,861	24,334	165	288,382	3,483	71
1910 ...	777,864	430,776	21,813	244	347,088	3,598	80
1911 ...	708,943	420,163	22,765	82	288,780	3,828	66
1912 ...	714,170	383,476	25,930	88	330,694	3,515	81
1913 ...	876,585	500,205	27,398	680	376,380	4,100	59
1914 ...	776,280	414,518	25,521	106	361,762	5,337	62
1915 ...	730,761	442,179	21,155	125	288,582	3,827	55
1916 ...	695,364	367,713	20,227	98	327,651	3,926	41
1917 ...	737,070	428,752	21,531	170	308,318	3,293	59
1918 ...	727,782	320,450	20,811	236	407,332	3,911	39
1919 ...	811,937	436,055	21,775	231	375,882	6,274	52
1920 ...	644,856	399,398	19,340	481	245,458	3,777	84
1921 ...	702,481	418,832	20,892	797	283,649	4,027	48
Total for Thirty-three Years	20,223,679	11,263,975	...	...	8,959,704	...	...

* Numbers in this year for nine months only.

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KEY PLAN OF THE ROYAL BOTANIC GARDEN, EDINBURGH
APRIL 1922.

Area of Garden, 57·648 Acres.
Above Sea-level—Highest point, 109 feet; Lowest point, 48 feet.

Wt 2853/170 -1000-782 McF & E.

Vol. XIII. FOR OFFICIAL USE Number LXI.

NOTES

FROM THE

ROYAL BOTANIC GARDEN, EDINBURGH.

SEPTEMBER 1920.

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Primula et Omphalogramma: Diagnoses Specierum Novarum.

BY

PROFESSOR BAYLEY BALFOUR, F.R.S.

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Primula adenantha, Balf. f. et Cooper.

Parva rosulata foliis floribusque coaetaneis. Folia petiolata ad 6.5 cm. longa ; lamina papyracea oblongo-ovalis ad 4 cm. longa 1.4 cm. lata, obtusa, margine irregulariter dentata dentibus acutis minute ciliatis, basim versus attenuata ; utrinque concolor subrugulosa pilis articulatis dense vestita, subtus costa media et venis primariis hirsutis ; petiolus circ. 2 cm. longus anguste alatus dense hirsutus. Scapus strictus erectus ad 20 cm. altus pubescens efarinosus capitulum florum sessilium nutantium sphaericum gerens ; bracteae inferiores ligulatae acutae saepe apice denticulatae sparsim glanduloso-pilosae ; anthopodium nullum. Calyx parvus campanulatus paullo ventricosus deflexus circ. 4 mm. longus extus pilis glanduliferis farinipotentibus conspersus, intus dense albo-farinosus ad medium 5-lobatus ; lobi inaequales glanduloso-ciliati. Corolla tubulosa caerulea circ. 1.4 cm. longa extus glanduloso-puberula ; tubus circ. 9 mm. longus vel in flore longistylo brevior ; limbus infundibuliformis intus sparsissime glanduloso-puberulus ; lobi circ. 3 mm. longi imbricati rotundati vel ovales paullo emarginati. Stamina in

flore longistylo paullo exserta, in brevistylo infra medium tubi corollini inserta. Ovarium globosum operculo crustaceo coronatum; stylus longus exsertus, brevis calycem subaequans; stigma discoideum. Capsula ovoidea e calyce persistente exserta, valvis 5 angustis dehiscens; placenta ovoidea fere sessilis. Species Sectionis Muscarioidis.

Bhutan. Singshi Timpu. Cooper. **1601.** 20th July 1914.

1459 **Primula Agleniana,** Balf. f. et Forrest.

Planta magnifica bulbosa ad 3 dm. alta. Folia ad 20 cm. longa (petiolo incluso); lamina lanceolata acuta deorsum in petiolum fere duplo longiorem attenuata grosse dentato-crenulata nunc subincisa subtus lacteo-farinosa. Scapus ad 3-florus leviter lacteo-farinosus; bracteae circ. 1 cm. longae; pedicelli nutantes ad 3.5 cm. longi. Calyx pallide viridis foliaceus utrinque lacteo-farinosus. Corollae limbus flavidus aurantiaco-oculatus ad 4 cm. diam. extus plus minusve farinosus. Species ex affinitate *P. callianthae,* Franch.

S.E. Tibet. Tsarong; Salween—Kiu-chiang divide. Forrest. **18,875.** July 1919.

1463 **Primula amabilis,** Balf. f. et Forrest.

Nana albido-farinosa caespitosa ad 6 cm. alta. Folia lineari-spathulata longe petiolata; lamina ad 2 cm. longa 4 mm. lata grosse dentata. Scapus rarius foliis longior umbellam 2–4-floram gerens; bracteae a basi lata subulatae atropurpureae pedicellos ad 4 mm. longos superantes. Calyx atropurpureus ad medium fissus; lobi ad 7 mm. longi acuti tubum corollinum fere aequantes. Corolla saturate purpurea griseo-oculata. Capsula ad 1 cm. longa pedicello ad 2 cm. aucto. Sectionis Nivalis *P. petraeae,* Balf. f. et Forrest, affinis.

S.E. Tibet. Tsarong; Salween—Kiu-chiang divide. Forrest. **18,897.** June 1919.

1751 **Primula apoclita,** Balf. f. et Forrest.

Rosulata foliis floribusque coaetaneis, perulis paucis vel nullis sub anthesi persistentibus. Folia papyracea circ. 5 cm. longa oblongo-spathulata in petiolum alatum pilosum attenuata; lamina circ. 1.5 cm. lata oblonga vel ovalis apice rotundata margine regulariter dentato-serrata plus minusve ciliata; supra pallide viridis pilis brevibus albidis conspersa; subtus glabra laevis ad venas pilosa. Scapus tenuis ad 16 cm. longus plus minusve flavido-farinosus deorsum glabrescens spicam florum sessilium patentium fragrantium parvam gerens; bracteae occultae lineari-lanceolatae vel lanceolatae acuminatae farinosae et glanduloso-ciliatae. Calyx cupularis circ. 3 mm. longus

flavido-farinosus ad medium in lobos inaequales fissus. Corolla saturate purpureo-caerulea tubulosa ; tubus circ. 1.4 cm. longus extus pilis farinipotentibus conspersus intus glaber rugulosus ; limbus concavus circ. 4 mm. longus intus farina conspersus ; lobi ovales vel obovales circ. 2.5 mm. longi minutissime retusi. Stamina floris brevistyli ad os tubi corollini inserta, longistyli basim tubi corollini versus calycem aequantia ; filamenta brevissima ; antherae flavae circ. .75 mm. longae. Ovarium globosum operculo crustaceo lobulato coronatum ; stylus brevis calyce dimidio brevior, longus tubo corollino brevior ; stigma latum discoideum. Species Sectionis Muscarioidis.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **14,201.** July 1917.

1741 **Primula atricapilla,** Balf. f. et Cooper.

Rosulata foliis floribusque coaetaneis basi alabastri perulis cincta. Folia petiolata ad 5 cm. longa ; lamina papyracea oblongo-ovalis 2–3 cm. longa, 1 cm. lata, obtusa vel apice rotundata, margine subrecurva breviter crenulato-dentata vel suberosa glanduloso-ciliata, basi in petiolum aequilongum vel paullo breviorem attenuata, efarinosa ; utrinque opaca fere concolor pilis glandulosis subscabriuscula ; subtus costa media dense pilosa ; petiolus glanduloso-pilosus. Scapus ad 12 cm. longus (sub fructu auctus) breviter glanduloso-puberulus efarinosus capitulum atricapillatum florum deflexorum gerens ; bracteae inferiores ligulatae obtusae deflexae, superiores atro-purpureae erectae. Calyx cupularis subventricosus deflexus circ. 5 cm. longus ad medium vel ultra 5-lobatus ; lobi inaequales (posteriore maximo elliptico truncato denticulato) glanduloso-ciliati utrinque sparsim glanduloso-pilosi saepe farinosi. Corolla caerulea circ. 1.3 cm. longa ; tubus cylindricus subangulatus in flore brevistylo circ. 9 mm. longus extus glaber in longistylo circ. 7 mm. longus ; limbus infundibuliformis circ. 4 mm. longus intus sparsim glanduloso-puberulus ; lobi erecto-patentes imbricati cuneati emarginati segmentis integris. Stamina in flore longistylo ad faucem corollinam inserta, in brevistylo ad medium tubi. Ovarium globosum ; stylus longus corollae tubum subaequans, brevis calyce paullo longior ; stigma discoideum depressum. Species Sectionis Muscarioidis.

Tibet. Philé-la. Cooper. **1771.** 23rd July 1914.

1471 **Primula atuntzuensis,** Balf. f. et Forrest.

Parva luteo-farinosa ad 7 cm. alta. Folia ad 4 cm. longa ; lamina anguste obovalis ad 6 mm. lata acutiuscula in petiolum discretum aequilongum angustata dentato-crenulata. Scapus foliis duplo longior umbellam 2–3-floram gerens ; bracteae

purpureae a basi lata lanceolatae pedicellos aequantes vel subaequantes ; pedicelli circ. 6 cm. longi. Calyx atropurpureus ; lobi oblongi acuti. Corollae purpureo-cyaneae tubus calycem duplo superans. Capsula circ. 1 cm. longa 2.5 mm. diam. pedicellis ad 1 cm. auctis. Species Sectionis Nivalis ex affinitate *P. petraeae*, Balf. f. et Forrest.

Western N.W. Yunnan. Mts. north of Atuntzu. Forrest. **13,986.** June 1917.

1547 **Primula boreio-calliantha,** Balf. f. et Forrest.

Lacteo-farinosa. Foliorum lamina lanceolata apice attenuata regulariter et minute crenulata. Scapus crassus folia dimidio superans umbellam secundam 2–3-floram gerens. Calyx circ. ad medium fissus ; lobi ovati. Corollae limbus imbricatus. Species Sectionis Nivalis ex phylo *P. callianthae*, Franch.

Eastern N.W. Yunnan. Mts. of Chungtien plateau. Forrest. **12,571.** June 1914.

1546 **Primula burmanica,** Balf. f. et Ward.

Robusta paludicola. Folia oblanceolata ad 30 cm. longa 5 cm. lata apice rotundata eroso-dentata deorsum in petiolum longum alatum attenuata plus minusve rugulosa efarinosa sed pilis farinipotentibus conspersa. Scapus crassus ad 60 cm. altus pilis farinipotentibus puberulus umbellam terminalem ad 16-floram et verticillos ad 6 inter se distantes gerens ; bracteae virides lineari-subulatae pedicellos recurvos ad 2 cm. longos puberulos superantes. Calyx viridis circ. 1.2 cm. longus intus albo-farinosus extus glanduloso-puberulus ; lobi acuminati subulati. Corollae rubro-purpureae aurantiaco-oculatae tubus calycem superans annulatus ; limbus circ. 1.4 cm. longus planus, lobi obcordati integri vel crenulati emarginati. Species *P. mallophyllo*, Balf. f. Sectionis Candelabrae valde affinis.

E. Upper Burma. Below Feng-shui-ling. F. Kingdon Ward. **1634.** 5th June 1914.

1512 **Primula bryophila,** Balf. f. et Farrer.

Luteo-farinosa rosulata. Rhizoma parvum sub anthesi ad collum squamis alabastri vestitum. Folia subligulata ad 15 cm. longa acuta deorsum in petiolum alatum vaginatum vix discretum attenuata margine recurva subtus dense luteo-farinosa. Scapus tenuis circ. 8 cm. longus glaber umbellam 2–3-floram gerens ; bracteae parvae ovatae membranaceae glabrae ; pedicelli filiformes glabri divergentes. Calyx cupulari-campanulatus circ. 6 mm. longus ultra medium 5-lobatus tubo angulato glaber sinubus inter lobos dense luteofarinosis exceptis ; lobi lanceolati circ. 4 mm. longi. Corollae plus minusve purpureae tubus

infundibuliformis annulatus intus puberulus extus glaber ; limbi discus puberulus, lobi subcuneati aperti circ. 6.5 mm. longi. Stamina in flore longistylo supra medium tubi corollini inserta calycem excedentia. Ovarium ovoideum ; stylus longus corollae tubum aequans. Species Sectionis Nivalis ex phylo *P. callianthae*, Franch.

N.E. Upper Burma. Hpimaw Pass. Farrer and Cox. **880.** 6th May 1919.

1621 **Primula calcicola,** Balf. f. et Forrest.

Caespitosa parva calcicola luteo-farinosa foliis praeteritis sub rosula dense vestita. Folia petiolata tenuia ovali-spathulata ad 3 cm. longa 6 mm. lata rotundato-obtusa minute denticulata deorsum in petiolum lamina longiorem attenuata ; supra laete viridia ; subtus luteo-farinosa. Scapus fragilis filiformis folia paullo superans uniflorus apicem versus bracteas duas minutas inaequales gerens ; pedicelli circ. 4 mm. longi. Calyx viridis 5-nervius ad medium fissus ; lobi a basi lanceolati subacuminati semipatentes utrinque luteo-farinosi. Corolla roseo-purpurea ? circ. 1.5 cm. longa. Species Sectionis Yunnanensis.

S.W. Szechwan. Mu-li. Forrest. **16,820.** Aug. 1918.

1631 **Primula carnosula,** Balf. f. et Forrest.

Parva epilosa rosulata. Folia carnosula erecta petiolato-spathulata ad 5 cm. longa regione laminari nunc orbiculari nunc ovali nunc rhomboidea integra vel minute dentata vel crenulata laete viridi subtus pallidiore utrinque obscure pulverulenta. Scapus validus ad 9 cm. longus pulverulentus superne leviter albo-farinosus umbellam 3–5-floram flore fragrante gerens ; bracteae lanceolatae basi incrassatae ad 7 mm. longae pedicellos albo-farinosos superantes intus albo-farinosae. Calyx purpureus pulverulentus intus albo-farinosus ad medium fissus ; lobi obtusi. Corollae ad 1.5 cm. longae tubus flavidus exannulatus calycem fere duplo superans ; limbus ad 6 mm. longus intense purpureo-lilacinus ; lobi bilobulati. Genitalia longiora ad os tubi corollini. Species ex affinitate *P. gemmiferae,* Batalin.

N.W. Yunnan. On the Bei-ma-shan. Forrest. **14,030.** June 1917.

1693 **Primula chrysophylla,** Balf. f. et Forrest.

Pulvinata semperviridis circ. 7 cm. alta ; rami plurimi tenues basi radicantes e radicis vertice radiantes foliis scapisque praeteritis siccis dense obtecti. Folia petiolata ad 4 cm. longa saepius minora ; lamina coriacea ovalis vel ovata vel oblongo-ovata vel elliptica nunc rotundata vel cordata ad 2 cm. longa 1.3 cm. lata margine recurvata crenulata vel undulata, basi abrupte contracta;

supra opaca viridis glandulis farinipotentibus conspersa ; subtus dense aureo-farinosa ; petiolus late alatus 2–4 mm. latus laminam aequans nunc ea longior vel brevior. Scapus terminalis sed lateraliter translatus aureo-farinosus ad 7 cm. longus infra inflorescentiam capituliformem 3-floram arcuatus ; bracteae fertiles involucratae atropurpureae aureo-farinosae, extimae trilobulatae. Flores secundi. Calyx campanulatus tubum corollinum fere aequans ad medium fissus plus minusve aureo-farinosus. Corolla saturate purpureo-rosea flavido-oculata ; tubus intus rugulosus in flore longistylo circ. 3 mm. longus ; limbus concavus ; lobi cuneati circ. 8 mm. longi bifidi. Stamina in flore longistylo infra medium tubi corollini inserta, in flore brevistylo supra medium. Ovarium globosum operculatum ; stylus longus calycem fere aequans. Capsula calyce paullo aucto inclusa. Species Sectionis Dryadifoliae.

S.W. Szechwan. Mu-li Mts. Forrest. **16,594.** Aug. 1914.

Primula chungensis, Balf. f. et Ward.

Rhizoma parvum. Folia petiolata sub anthesi circ. 8 cm. longa plus minusve erecta ; lamina oblongo-ovalis ad 3 cm. lata late crenulata deorsum in petiolum late alatum breviorem attenuata efarinosa sed pilis farinipotentibus conspersa. Scapus robustus ad 48 cm. longus umbellam terminalem 4–8-floram et verticillos ad 4 inter se distantes gerens ad nodos albo-farinosus. Flos fragrans ; bracteae breves albo-farinosae ; pedicelli circ. 1 cm. longi sub fructu aucti. Calyx campanulatus circ. 5 mm. longus plerumque efarinosus. Corollae aureae tubus annulatus circ. 1.3 cm. longus ; lobi aperti circ. 6 mm. longi obcordati. Species Sectionis Candelabrae forsan ad *P. Cockburnianam*, Hemsl. spectans.

N.W. Yunnan. Chung Valley. Sha-ka-la. F. K. Ward. **259.** May 1913.

Primula cyanantha, Balf. f. et Forrest.

Rosulata foliis floribusque coaetaneis. Folia petiolata sub anthesi ad 14 cm. longa ; lamina papyracea oblongo-ovalis ad 12 cm. longa 5 cm. lata, apice rotundata et cum margine inaequaliter dentato vel crenato vel dentato-lobulato ciliata, basi in petiolum alatum circ. 2 cm. longum attenuata ; supra pallide viridis pilis paucis articulatis conspersa ; subtus glauca laevis pilis mollibus paucis praedita, costa media venisque primariis hirsutis. Scapus ad 30 cm. longus validus plus minusve luteo-farinosus spicam saepe 3 cm. longam multifloram (floribus sessilibus deflexis fragrantibus) crista apicali florum juvenilium et bractearum purpurearum coronatam gerens ; bracteae inferiores deflexae lineari-lanceolatae acuminatae virides ; antho-

podium nullum. Calyx cupularis ventricosus luteo-farinosus circ. 5 mm. longus, ultra medium 5-lobatus ; lobi inaequales glanduloso-ciliati. Corolla intense cyanea tubulosa circ. 1.4 cm. longa, extus sparsim luteo-farinosa, intra tubum glabra ; limbus infundibularis intus farinosus ; lobi circ. 2 mm. longi obovati vel subquadrati paullo emarginati. Stamina in flore brevistylo ad faucem tubi corollini inserta antheris tubo brevioribus, in flore longistylo infra medium tubi inserta calyce breviora. Ovarium globosum operculo coronatum ; stylus brevis basim antherarum attingens, longus corollae tubo dimidio brevior ; stigma latum discoideum. Species speciosa Sectionis Muscarioidis.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **14,366.** July 1917.

1708 **Primula cyanocephala,** Balf. f.

Epilosa floribus praecocibus. Folia rosulata alabastri squamis rufis coriaceis circumcincta sub anthesi ad 10 cm. longa ad 2.5 cm. lata membranacea oblongo-obovata vel suboblanceolata obtusa margine sinuata obscure denticulata deorsum in petiolum late alatum attenuata, juvenilia utrinque plus minusve pubescentia, adulta supra glabrescentia venis primariis a costa media lata brunnea prominula fere patulim excurrentibus. Scapus robustus ad 20 cm. altus glaber apicem versus dense albo-farinosus umbellam globosam dense multifloram gerens ; bracteae membranaceae plus minusve albo-farinosae exteriores ovato-oblongae caudatae 7 mm. longae basi ampliatae pedicellos cucullatim circumvaginantes fere auriculatae infra gibbosae ; pedicelli ad 5 mm. longi bracteis breviores validi plus minusve farinosi. Calyx membranaceus plus minusve farinosus 1 cm. longus breviter campanulatus ultra medium fissus ; lobi lineari-ligulati obtusi hydathodo apicali inconspicuo. Corollae limbus intense purpureus luteo-oculatus ; tubus erubescens cylindricus supra paullo ampliatus, extus plus minusve farinosus, intus supra stamina tenuiter transverse rugosus exannulatus ; lobi ex parte integra limbi (vix 1 mm. lata) orientes ad 7 mm. longi 7 mm. lati obovati profunde bipartiti. Floris brevistyli stamina infra os tubi corollini inserta antherarum apicibus ab ore 2 mm. remotis, filamentis brevissimis, antheris elongatis 2 mm. longis, longistyli ad basim tubi corollini inserta apicibus antherarum ab ore 6 mm. remotis. Ovarium discoideum superne incrassatum ; stylus longus tenuis ruber calyce longior corolla triente brevior ; brevis vix calycis tubum aequans ruber ; stigma magnum cylindricum lobulatum. Species speciosa ex phylo *P. denticulatae,* Sm.

E. Yunnan. Tong Tchouan. Maire. April.

1695 **Primula cycliophylla,** Balf. f. et Farrer.

Caespitosa flavido-farinosa ramis prostratis patentibus brevibus. Folia circ. 1.5 cm. longa; lamina orbicularis petiolum paullo superans. Scapus tenuis circ. 2 cm. longus 2-florus floribus subsecundis parvis vix 1.5 cm. diam.; corolla pallide roseo-kermesina. Species Sectionis Dryadifoliae.

N.E. Burma. Chimili Alps. Farrer and Cox. **1183.** Aug. 1919.

1540 **Primula declinis,** Balf. f. et Forrest.

Robusta et florosa. Folia ad 20 cm. longa; lamina lanceolata tenuiter dentato-crenulata in petiolum aequilongum rubrum sulcatum attenuata subtus albida. Scapus robustus folia saepe duplo superans umbellam ad 20-floram nunc verticillum inferum gerens; bracteae e basi lata lineari-subulatae involucrantes; pedicelli ad 2 cm. longi sub fructu ad 6 cm. Calyx viridi-angulatus vix ad trientem fissus; lobi ovati eglandulosi. Corollae tubus calycem fere triente superans. Genitalia longa fere exserta, brevia calycis tubo breviora. Species *P. decurvae,* Balf. f. et Forrest, *P. reflexae,* Petitm., *P. szechuanicae,* Pax, affinis.

S.W. Szechwan. Mu-li Mts., valley of the Litang. Forrest. **16,290.** June 1918.

1541 **Primula decurva,** Balf. f. et Forrest.

Robusta. Folia papyracea ad 12 cm. longa; lamina ovalis vel oblongo-ovalis 2–3 cm. lata dentato-crenulata in petiolum aequilongum attenuata; subtus pallide grisea. Scapus foliis duplo longior umbellam ad 8-floram gerens; bracteae ovatae longe acuminatae pedicellos superantes; pedicelli raro 1 cm. longi. Calyx pallide viridis; lobi lanceolato-acuti glanduloso-ciliati. Corollae lacteae tubus calycem triente vel quadrante superans; lobi ad 4 mm. lati integri vel emarginati. Species ex phylo *P. szechuanicae,* Pax, *P. orbicularis,* Hemsl., *P. reflexae,* Petitm.

Eastern N.W. Yunnan. Mts. of the Chungtien plateau. Forrest. **12,551.** June 1914.

Primula densa, Balf. f.

Species parva pulvinata. Folia petiolata ad 3.5 cm. longa; lamina cordato-ovata obtusa ad 2 cm. lata crenulato-lobata; supra rugosa glandulosa; subtus venae pilosae; petiolus hirsutus. Scapus ad 6 cm. altus glandulosus et sparsim pilosus; umbella solitaria ad 6-flora; bracteae virides oblongae pedicellis breviores glandulosae; pedicelli validi ad 1 cm. longi glandulosi. Calyx apertus campanulatus vix ad medium 5-lobus; lobi ovati.

Corolla roseo-suffusa luteo-oculata annulata ; tubus calycem dimidio superans ; limbus 1.5 cm. diam. ; lobi obovati emarginati. Stylus longus ad os corollae attingens. Species Sectionis Obconico-Listeri.

N.E. Upper Burma. Ward. **3536.**

Primula firmipes, Balf. f. et Forrest.

Luteoflora ubique pilis brevibus farini-potentibus sparsim obtecta. Folia longe petiolata ad 16 cm. longa ; lamina papyracea ovata vel elliptica ad 5 cm. longa 2.5 cm. lata cordata crenulato-serrata ; subtus glauca. Scapus rigidus ad 16 cm. longus umbellam 4–5-floram floribus fragrantibus gerens ; bracteae vix 1 cm. longae subfoliaceae virides cucullatae denticulatae ; pedicelli stricti erecti ad 3.5 cm. longi. Calyx ad 7 mm. longus angulatus intus flavido-farinosus ad medium fissus ; lobi erecti a basi lanceolati apice tuberculati. Corolla circ. 2.5 cm. longa ; tubus infundibuliformis in limbum concavum farinosum ampliatus exannulatus ; lobi suberecti obovati. Genitalia longiora calycem superantia. Semina laevia. Species ad Sectionem Sikkimensem forsan referenda.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,899.** July 1919.

1453 **Primula flexilipes,** Balf. f. et Forrest.

Luteoflora. Folia longe petiolata ad 18 cm. longa ; lamina papyracea ovalis vel oblongo-ovalis nunc subrotundata ad 6 cm. longa 3 cm. lata cordata grosse crenulata ; utrinque viridis et pilis farini-potentibus obtecta. Scapus subtenuis ad 36 cm. longus superne flavido-farinosus ; umbella ad 8-flora floribus nutantibus fragrantibus ; bracteae virides oblongae acuminatae vel apiculatae subdenticulatae circ. 1.2 cm. longae ; pedicelli filiformes flexiles farinosi ad 2.5 cm. longi. Calyx circ. 5 mm. longus farinosus angulatus ad medium fissus ; lobi lanceolati acuti recurvi. Corollae circ. 2 cm. longae tubus infundibuliformis extus farinosus in limbum concavum intus farinosum ampliatus exannulatus ; lobi suberecti obovati. Genitalia longiora calycem superantia. Species in Sectionem Sikkimensem pertinens et ad *P. firmipedem* arcte accedens.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,874.** July 1919.

1241 **Primula humicola,** Balf. f. et Forrest.

Tenuis humicola stolonifera, stolonibus inter muscos laxos late patentibus. Folia petiolata ad 16 cm. longa 1–2 a quaque gemma exeuntia ; lamina cordato-palmatifida 7-loba circ. 6–7 cm. diam. lobis acutis irregulariter dentatis ; utrinque plus

minusve molliter pilosa ; petiolus villosus. Scapus folia breviter superans plus minusve pilosus ; umbella solitaria 2–4-flora ; bracteae lanceolatae acuminatae ; pedicelli filiformes pubescentes ad 1.3 cm. longi. Calyx cum tubo corollae glandulis minutissimis conspersus subpatens rubro-tinctus circ. 7 mm. longus ad medium fissus ; lobi lanceolati. Corollae roseae exannulatae circ. 2 cm. longae tubus calycem duplo superans ; lobi obcordati. Genitalia longiora ad os corollae attingentia. In Sectione Geranioide juxta *P. alsophilam*, Balf. f. et Farrer ponenda.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **14,236.** July 1917.

Primula hymenophylla, Balf. f. et Forrest.

Humicola. Folia longe petiolata erecta ad 16 cm. longa ; lamina membranacea cordato-orbicularis vel elliptica ad 7 cm. diam. profunde 11-loba lobis obtusis 2–3-dentatis dentibus vix apiculatis ; utrinque concolor glandulis conspersa et pilis praecipue ad venas induta ; petiolus plus minusve villosus. Scapus ad 28 cm. altus sparsim pubescens ; umbella ad 5-flora ; bracteae lanceolatae ; pedicelli sub anthesi stricti pubescentes ad 2 cm. longi bracteas multo superantes. Calyx campanulatus costatus glandulosus puberulus ad medium vel ultra fissus ; lobi a basi lanceolati. Corollae ad 2 cm. longae purpureae tubus annulatus extus puberulus. Genitalia longiora ad os corollae. Species ex affinitate *P. lichiangensis*, G. Forrest.

S.E. Tibet. Tsarong. Doker-la. Forrest. **16,794.** July 1918.

Primula junior, Balf. f. et Forrest.

Parva leviter griseo-farinosa. Foliorum lamina ovalis vel obovalis sub anthesi ad 4 cm. longa 1.5 cm. lata apice rotundata dentato-crenulata. Scapus tenuis brevis ad 10 cm. longus folia superans subtiliter farinosus umbellam bifloram erectam vel subnutantem gerens ; bracteae lineari-acuminatae pedicellos aequantes ; pedicelli vix 5 mm. longi. Calyx vix 1 cm. longus ad medium fissus ; lobi acuminati. Corollae tubus calycem duplo superans ; stylus longus ad annulum conspicuum attingens. Stamina longiora ad os corollae inserta. Species inter formas *P. callianthae*, Franch. proximas in Sectione Nivali ponenda.

Yunnan. Forrest. **14,228.**

Primula kiuchiangensis, Balf. f. et Forrest.

Luteo-farinosa ad 17 cm. alta. Folia ad 6 cm. longa ; lamina ovalis vel oblonga ad 1.8 cm. lata obtusa vel apice rotundata dentato-crenata in petiolum alatum vix discretum attenuata. Scapus validus ad 9 cm. longus umbellam ad 5-floram gerens ; bracteae a basi lata subulatae vix 6 mm.

longae pedicellos aequantes. Calyx viridis ad medium fissus ; lobi acuti ad 1 cm. longi. Corollae pallide purpureo-cyaneae ad 2.5 cm. longae tubus calycem multo excedens. Genitalia longiora ad annulum attingentia. Capsula 1.3 cm. longa 2.5 mm. diam. pedicellis ad 2 cm. auctis. Species Sectionis Nivalis ex affinitate *P. petraeae*, Balf. f. et Forrest.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,898.** June–July 1919.

1753 **Primula lepta,** Balf. f. et Forrest.

Parva delicata rosulata foliis floribusque coaetaneis sub anthesi basi perulis alabastri cincta. Folia tenuia papyracea plerumque oblanceolata in petiolum alatum gradatim attenuata, nunc parte laminari distincta oblongo-ovali vel oblonga breviter et cuneatim in petiolum angustata, ad 4.5 cm. longa 1 cm. lata plerumque minor, apice rotundata vel obtusa, margine crenato-dentata ciliata ; supra pallide viridis breviter pubescens ; subtus glauca laevis subnitida plus minusve hirsuta ; petiolus lamina dimidio brevior sed saepe longior, ciliatus. Scapus fragilis ad 9 cm. longus plerumque minor, plus minusve luteo-farinosus, capitulum parvum purpureo-coronatum florum deflexorum gerens ; bracteae inferiores lineari-lanceolatae acutae virides (in juventute purpureae) calyce paullo longiores, ciliatae. Calyx campanulatus circ. 3 mm. longus intus dense luteo-farinosus, extus glandulis farini-potentibus conspersus, ad medium vel ultra 5-lobatus ; lobi inaequales. Corolla intense purpureo-cyanea circ. 1 cm. longa tubulosa supra in limbum concavum intus farinosum expansa ; lobi rotundati circ. 2 mm. longi obscure retusi vel denticulati. Stamina in flore brevistylo ad faucem tubi corollini inserta, in longistylo basim versus inserta ; filamenta simulac antherae purpurea. Ovarium globosum operculo crustaceo coronatum ; stylus brevis calyce multo brevior, longus tubum corollinum aequans ; stigma latum discoideum. Species Sectionis Muscarioidis.

Eastern N.W. Yunnan. Mts. N.E. of Chung-tien. Forrest. **16,475.** July 1918.

1825 **Primula leucantha,** Balf. f. et Forrest.

Pulchra albiflora albo-farinosa. Folia lanceolata vel oblongo-ovalia ad 20 cm. longa 3.5 cm. lata obtusa undulata et dentibus hydathodalibus minutis marginata deorsum in petiolum alatum haud discretum attenuata ; utrinque concoloria pilis farini-potentibus conspersa. Scapus robustus ad 38 cm. longus obscure pulverulentus ad apicem albo-farinosus umbellam pluri-floram et verticillos inter se remotos gerens ; bracteae filiformes ; pedicelli tenues stricti patentes circ. 1.5 cm. longi bracteas

superantes. Calyx spadiceus campanulatus intus dense albo-farinosus ; lobi carinati lanceolato-acuminati. Corollae albae aureo-oculatae circ. 2 cm. longae tubus calycem superans ; lobi obovati. Stamina floris brevistyli ad os corollae inserta. Species ex affinitate *P. Beesianae*, G. Forrest in Sectione Candelabra.

S.W. Szechwan. Tsarong. Muli Mts., valley of the Litang. Forrest. **16,255.** June 1918.

Primula limbata, Balf. f. et Forrest.

Albo-farinosa, gemmae hibernaculo brevi, squamis suis sub anthesi a basi explanatis. Folia ad 10 cm. longa 3 cm. lata firma subcoriacea anguste obovata acuta vel obtusa eroso-dentata in petiolum brevem vix discretum attenuata ; subtus griseo-farinosa et farina alba dense limbata. Scapus robustus ad 16 cm. longus obscure farinosus umbellam plurifloram gerens ; bracteae lineares ; pedicelli tenues bracteas superantes. Calyx purpureus albo-farinosus. Corolla violaceo-purpurea. Capsula cylindrica circ. 8 mm. longa. Species Sectionis Nivalis-verae.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,304.** July 1917.

Primula maikhaensis, Balf. f. et Forrest.

Caespitosa luteo-farinosa foliis praeteritis dense vestita. Folia obovato-spathulata ad 4.5 cm. longa 1.5 cm. lata apice rotundato-obtusa leviter crenulato-dentata ; supra atro-olivacea ; subtus luteo-farinosa ; petiolus alatus membranaceo-vaginatus. Scapus folia aequans obscure pulverulentus ; umbella 2–3-flora ; bracteae pulverulentae intus luteo-farinosae oblongae acutae ; pedicelli bracteas vix superantes pulverulenti. Calyx ad medium fissus extus pulverulentus intus luteo-farinosus ; lobi oblongi obtusi. Corolla roseo-purpurea oculo viridi-flavido calycem duplo superans circ. 2 cm. longa exannulata ; lobi obovati bilobulati. Genitalia longiora ad os corollae. Species Sectionis Yunnanensis.

N.W. Yunnan. N'Maikha-Salween divide. Forrest. **18,094.** June 1919.

Primula metria, Balf. f. et Cooper.

Parva rosulata efarinosa. Folia longe petiolata ascendentia sub anthesi ad 3.5 cm. longa ; lamina oblonga vel ovalis vel elliptica vel ovata vel subcordiformis ad 2 cm. longa 1.2 cm. lata, obtusa vel apice rotundata, margine crenato-dentata, basi abrupte contracta nunc cordata, vel in foliis oblongis cuneata et in petiolum attenuata, utrinque opaca et pilis albis mollibus articulatis densissime vestita, subtus pallidior ; petiolus laminam aequans vel ea longior. Scapus circ. 6 cm. longus strictus

pubescens efarinosus spicam capituliformem floribus deflexis gerens ; bracteae lineari-lanceolatae acutae ; pedicellus 0. Calyx foliaceus cupuliformis ventricosus deflexus postice circ. 6 mm. longus extus glaber intus pilosus ultra medium 5-lobatus ; lobi inaequales eciliati vel sparsim ciliati, posteriore maximo circ. 3 mm. lato obtuso vel subtruncato et denticulato. Corolla pallide caerulea vel alba ad 1.4 cm. longa ; tubus cylindricus extus glaber circ. 7.5 mm. longus ; limbus infundibuliformis intus copiose glanduloso-puberulus ad medium 5-lobatus ; lobi cuneati truncati paullo emarginati. Stamina in flore longistylo ad medium tubi corollini inserta, in brevistylo ad os. Ovarium latum ; stylus longus corollae tubum aequans, brevis calyce dimidio brevior ; stigma discoideum depressum. Species Sectionis Muscarioidis.

Bhutan. Champa Pumthang. Cooper. **4042.** 21st June 1915.

1744 **Primula micropetala,** Balf. f. et Cooper.

Rosulata parva rhizomate brevi foliis floribusque coaetaneis sub anthesi foliis praeteritis cincta. Folia petiolata ad 5.5 cm. longa ; lamina oblongo-ovalis ad 3 cm. longa circ. 1 cm. lata, apice obtusa vel rotundata, margine integra vel obscure crenato-dentata brevissime ciliata deorsum in petiolum gradatim attenuata ; utrinque fere concolor pilis plurimis brevibus mollibus multicellularibus puberula ; petiolus laminam aequans vel ea brevior anguste alatus deorsum in vaginam longam angustam membranaceam expansus. Scapus circ. 10 cm. longus viridis brevissime glanduloso-puberulus capitulum parvum florum deflexorum gerens ; bracteae inferiores lineari-lanceolatae acutae membranaceae ciliatae. Calyx cupularis ventricosus deflexus extus intusque glanduloso-puberulus, ultra medium 5-lobatus ; lobi inaequales ovales vel elliptici apiculati ciliati. Corolla cyanea circ. 1 cm. longa subcarnosula ; tubus circ. 7 mm. longus extus glaber ; limbus erectus anguste cupularis intus glaber ; lobi 5 imbricati parvi obovati paullo emarginati circ. 2 mm. longi. Stamina in flore longistylo infra medium tubi corollini inserta. Ovarium globosum operculo crustaceo coronatum ; stylus longus fere exsertus ; stigma capitatum. Species Sectionis Muscarioidis.

Bhutan. Champa Pumthang. Cooper. **4056.** 20th June 1915.

1696 **Primula mystrophylla,** Balf. f. et Forrest.

Caespitosa prostrata semperviridis ramosissima ; rami ad 15 cm. elongati foliis scapisque praeteritis siccis dense induti. Folia parva cochleariformia circ. 2 cm. longa ; lamina papyracea

elliptica vel orbicularis vel cordata crenata ; supra atroviridis pilis glandulosis farini-potentibus conspersa ; subtus luteo-farinosa ; petiolus lamina duplo longior alatus pilis glandulis ut lamina conspersus. Scapus inter folia immersus erectus tenuis vix 1 cm. longus luteo-farinosus ; bracteae exteriores duae involucratae late ovatae virides plus minusve luteo-farinosae, interiores minores ; pedicelli vix 2 mm. longi. Calyx campanulatus corollae tubo brevior viridis plus minusve luteo-farinosus ad medium 5-lobatus ; lobi elliptico-ovati obtusi minute glanduloso-ciliati. Corolla violacea ; tubus circ. 7–9 mm. longus cylindricus extus glaber intus ad faucem glanduloso-puberulus, annulatus ; limbus planus ; lobi cuneati circ. 1 cm. longi bifidi. Stamina in flore longistylo infra (in brevistylo supra) medium tubi corollini inserta. Ovarium globosum operculo coronatum ; stylus brevis calycis tubum aequans, longus calyce paullo longior et corollae tubo brevior. Capsula calyce inclusa. Semina brunnea papulata. Species Sectionis Dryadifoliae.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **14,221.** July 1917.

1673 **Primula nanobella,** Balf. f. et Forrest.

Perpusilla radicibus basi erubescentibus habitu *P. bellae*, Franch. sed minor. Folia ad 8 mm. longa parvula spathulata ; lamina orbicularis vel subrhomboidea ad 5 mm. diam. inciso-dentata dentibus recurvis subquadratis apiculatis vel crenata supra viridis subtus elevato-nervosa luteo-farinosa deorsum in petiolum brevem alatum laminam aequantem cuneatim attenuata. Scapus brevissimus ad 1 cm. longus plerumque foliis inclusus subtiliter luteo-farinosus uniflorus ; bracteae 2 purpurascentes extus et intus plus minusve luteo-farinosae exterior elliptica vel oblonga ad 3.5 mm. longa apice denticulata interior minor saepe lanceolata obtusa ; pedicellus nullus vel vix evolutus. Calyx campanulatus 4–6 mm. longus adpressus extus purpurascens sparsim luteo-farinosus intus pallidior dense luteo-farinosus, vix ad medium fissus, lobis inaequalibus late oblongis subquadratis vel rectangularibus apice latis apiculatis vel denticulatis. Corollae magnae intense purpureae tubus erubescens calycem aequans vel paullo superans extus glaber intus ad faucem pilis pulvinatim occlusus ; limbi discus ad 2 mm. diam. ; lobi imbricati ad 8 mm. lati obovati ad medium bifidi. Species Sectionis Bellae.

N.W. Yunnan. Likiang Range. Forrest. **2399.** July 1906.

1690 **Primula pectinata,** Balf. f. et Forrest.

Parva rosulata efarinosa sed foliis scapo bracteis pedicellis calyceque pilis brevibus farini-potentibus plus minusve praeditis.

Folia petiolata ad 4 cm. longa 1.5 cm. lata ; lamina ovalis nunc rotundata petiolum subaequans pinnatim incisa in petiolum abrupte contracta, dentibus oblongis integris apiculatis brevissime ciliatis ; subtus pallidior. Scapus ad 9 cm. longus ; umbella ad 8-flora floribus secundis ; bracteae filiformes pedicello longiores. Calyx angustus ultra medium fissus ; lobi angusti acuminati. Corolla pallide caerulea calycem duplo superans ; lobi obovati bilobulati. Species Sectionis Souliei ex affinitate *P. incisae*, Franch.

S.W. Szechwan. Mu-li Mts. Forrest. **16,805.** Aug. 1918.

1473 **Primula petraea,** Balf. f. et Forrest.

Flavido-farinosa caespitosa. Folia tenuia ad 6 cm. longa longe petiolata ; lamina ovalis vel oblongo-ovalis ad 3 cm. longa 1 cm. lata apice obtusa vel rotundata dentato-crenata ; subtus leviter farinosa. Scapus ad 8 cm. longus umbellam ad 10-floram (nunc paucifloram) gerens ; bracteae ovato-acuminatae ; pedicelli ad 1.5 cm. longi bracteis triplo longiores ; anthopodium conspicuum. Calyx purpureus ad 8 mm. longus ; lobi ligulati obtusi vel acutiusculi. Corollae pallide violaceo-roseae ad 2.5 cm. longae tubus annulatus calycem duplo superans ; lobi obovati ad 8 mm. longi integri. Genitalia longiora intra os corollae. Capsula ad 2 cm. longa 2 mm. diam. pedicello aucto ad 4 cm. longo. Species Sectionis Nivalis *P. minori*, Balf. f. et Ward affinis.

N.W. Yunnan. Bei-ma-shan. Forrest. **13,940.** June 1917.

1829 **Primula proba,** Balf. f. et Forrest.

Leviter griseo-farinosa. Folia papyracea ; lamina ovalis margine dentato-crenata obtusa vel rotundata. Scapus robustus subtiliter farinosus umbellam terminalem et verticillos 1–2 inter se remotos gerens ; bracteae involucrantes acuminatae ad 1 cm. longae ; pedicelli ad 2 cm. longi. Calyx ultra medium fissus ; lobi subpatentes extus subtiliter farinosi. Corollae tubus calycem duplo superans. Species ex affinitate *P. callianthae*, Franch.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **16,744.** Aug. 1918.

1787 **Primula propinqua,** Balf. f. et Forrest.

Elata leviter griseo-farinosa. Foliorum elongatorum lamina lanceolata sursum attenuata grosse crenulata. Scapus robustus elatus ad 30 cm. subtiliter farinosus umbellam ad 5-floram gerens; bracteae ad 1 cm. longae ; pedicelli ad 3 cm. longi. Calyx ad 1.2 cm. longus tubum corollinum aequans circ. ad medium fissus ;

lobi brunnei obtusi. Species Sectionis Nivalis ad phylum *P. callianthae*, Franch. spectans.

Yunnan. Forrest. **14,251.** July 1917.

Primula pygmaeorum, Balf. f. et W. W. Sm.

Herba perennis minuta forsan paludicola rosulata rhizomate brevi radices plurimas emittente foliorum vaginis et scapis praeteritis marcidis obtecto. Folia petiolata haud 2 cm. longa; lamina ab apice petioli horizontaliter patens crassa carnosula oblongo-ovalis ad extremitates attenuata circ. 5.5 mm. longa 2.5 mm. lata glabra obtusa, margine integra haud cartilaginea, basi in petiolum membranaceo-alatum angustata; petiolus lamina longior erectus in dimidio supero ligulatus. Scapus foliis immersus ad 6 mm. longus strictus glaber umbellam 3-floram gerens; bracteae glabrae involucratae oblongae vel ovales apice rotundatae nunc brevissime apiculatae circ. 1 cm. longae stramineae haud gibbosae; pedicelli stricti divaricati ad 2.5 mm. longi superne in anthopodium magnum expansi. Calyx tubulosus circ. 4 mm. longus glaber; tubus angulatus in lobos 5 erectos elongato-triangulares obtusos viridis circ. 1.75 mm. longos fissus. Corollae in flore longistylo tubus cylindricus circ. 5 mm. longus calycem paullo superans glaber crenulato-annulatus; limbi plani lobi circ. 2.75 mm. longi cuneati profunde bilobulati. Stamina medium tubi corollini versus inserta antherarum apicibus ab annulo 1.5 mm. remotis. Ovarium oblongo-ovoideum; stylus longus tenuis ruber exsertus; stigma ovoideum parvum stylo paullo latius.

Tibet. Khambajang. Younghusband. **18.** July 1903.

Primula rigida, Balf. f. et Forrest.

Caespitosa flavido-farinosa. Folia firma oblongo-spathulata ad 5.5 cm. longa ad 1 cm. lata acuta integra vel subtiliter crenulata; subtus dense farinosa. Scapus validus rigidus foliis vix longior umbellam ad 8-floram gerens; bracteae purpureae lanceolatae acuminatae ad 7 mm. longae; pedicelli ad 1.5 cm. longi tenues. Calyx purpureus ad 1 cm. longus corollae tubo paullo brevior. Corolla pallide purpureo-rosea ad 2 cm. longa, lobi ovales crenulati. Capsula ad 1.5 cm. longa 2.5 mm. lata pedicello haud aucto. Species Sectionis Nivalis ex phylo *P. petraeae*, Balf. f. et Forrest.

S.W. Szechwan. Mu-li Mts., valley of the Litang. Forrest. **16,280.** July 1918.

Primula russeola, Balf. f. et Forrest.

Majuscula albo-farinosa hibernaculo sub anthesi disrupto squamis vaginalibus fibrosim decompositis. Folia elongata ad

30 cm. longa 5 cm. lata oblongo-ovalia vel ovalia obtusa nunc subrotundata minute dentata in petiolum longum membranaceum attenuata primo pallide viridia postea et sub anthesi russeta ; subtus subtiliter albo-farinosa. Scapus crassus folia subaequans leviter farinosus ; umbella pluriflora floribus fragrantibus ; bracteae virides circ. 2.5 cm. longae efarinosae ; pedicelli dense albo-farinosi bracteas subaequantes. Calyx brunneo-purpureus corolla brevior ; lobi anguste oblongo-ovales intus dense albo-farinosi. Corolla saturate purpureo-rosea. Species Sectionis Nivalis-verae.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **14,593.** Aug. 1917.

520 **Primula sataniensis,** Balf. f. et Farrer.

Foliorum lamina cordiformis ad 6 cm. longa petiolum duplo superans profunde 10–12-lobata lobis obtusis et obtusatim dentatis utrinque sparsissime glandulosa et puberula ; petiolus subvillosulus. Scapus folia multo superans ; umbella ad 7-flora floribus fere sessilibus ; bracteae foliaceae involucrantes. Calyx 5-vittatus. Corollae purpureo-rubrae tubus calycem longe superans. Species Sectionis Cortusoidis *P. lichiangensi*, G. Forrest affinis.

Kansu. Satanee and Gahoba Ranges. Farrer and Purdom. **61.** 19th May 1914.

1517 **Primula shweli-calliantha,** Balf. f. et Forrest.

Foliorum lamina ovalis vel oblongo-ovalis integra vel tenuiter crenulata. Scapus folia vix superans ; umbella 3–5-flora erecta ; bracteae breves acutae vel obtusae ; pedicelli bracteas multo superantes. Calycis lobi oblongi obtusi vel truncati apice denticulati. Corollae tubus calycem dimidio superans annulo bene evoluto. Species haec Sectionis Nivalis est forma occidentalis *P. callianthae,* Franch. cujus typus in montibus circum Tali invenitur.

Western Yunnan. Shweli-Salween divide. Forrest. **17,682.** June 1918.

1219 **Primula sikuensis,** Balf. f. et Farrer.

Planta umbratilis. Folia longe petiolata ad 14 cm. longa erecta ; lamina cordato-elliptica vel reniformis circ. 4.5 cm. longa palmatiloba lobis 9 obtusis dentatis ; utrinque glanduloso-pilosa ; petiolus villosus. Scapus folia subaequans villosulus ; umbella 5–7-flora ; bracteae circ. 5 mm. longae oblongae immersae apiculatae villosulae ; pedicelli circ. 2 cm. longi glanduloso-puberuli bracteas multo superantes. Calyx viridis

nervosus subvillosulus ad medium fissus. Corollae rubro-purpureae tubus calycem duplo superans. Species *P. lichiangensi*, G. Forrest affinis.

Kansu. Siku Range. Farrer and Purdom. **86.** 1914.

Primula sinodenticulata, Balf. f. et Forrest.

Rhizoma crassum radicibus carnosulis foliis siccis anni praeteriti persistentibus floribusque praecocibus. Folia rosulata sub anthesi alabastri squamis rufo-brunneis basi circumscripta ad 8 cm. longa ad 2.5 cm. lata oblonga vel obovato-oblonga vel oblongo-spathulata membranacea obtusa margine leviter reflexa sinuata nunc obscure denticulata deorsum paullo angustata et ligulata perlucens, utrinque minutissime puberula, venis primariis a costa media rubro-tincta acute et stricte adscendentibus, post anthesin accrescentia ad 15 cm. longa ad 4 cm. lata vel majora. Scapus robustus ad 22 cm. (sub fructu ad 6 dm.) altus glaber apicem versus dense luteo-farinosus umbellam unam multifloram globosam gerens ; bracteae 7 mm. longae membranaceae plus minusve luteo-farinosae exteriores latae hastatae apicem versus subito in caudam ligulatam obtusam constrictae basi circum pedicellos cucullatae subauriculatae infra breviter gibbosae, interiores angustiores ; pedicelli plus minusve luteo-farinosi 7 mm. longi bracteis aequilongi (anthopodio 3.25 mm. obconico excluso) stricti rigidi. Calyx 8.5 mm. longus membranaceus ultra medium fissus plus minusve farinosus tubo obconico ; lobi 5 mm. longi lineari-ligulati acuti saepe purpurascentes acutissimi hydathodo conspicuo. Corollae limbus purpureus albo-oculatus ; tubus extus erubescens ad 1.2 cm. longus angustus tubulosus non ampliatus intus exannulatus supra stamina transverse rugosus infra membranaceus venulosus ; limbi pars integra vix 1 mm. longa ; lobi magni obovati 1 cm. longi 6 mm. lati bipartiti. Floris brevistyli stamina supra medium corollae tubi inserta filamentis brevibus vix 1 mm. longis antheris 2 mm. longis apicibus ab ore 2.5 mm. remotis, longistyli infra medium tubi corollini inserta apicibus antherarum 4.5 mm. ab ore remotis. Ovarium globosum vertice operculatim incrassatum ; stylus ruber longus tenuis calycis lobos aequans, brevis calycis lobis multo brevior ; stigma parvum cylindricum rubrum. Capsula ad 6 mm. longa anguste oblongo-ovoidea calycem albidum membranaceum aequans (placenta globosa stipitata) ab apice valvis crustaceis lanceolatis dehiscens. Semina brunnea .5 mm. longa ; testa cellulis aeriferis rugosa. Species ex phylo *P. denticulatae,* Sm.

Mid W. Yunnan. Tali Range. Forrest. **1801.** May 1906.

1477 **Primula sinonivalis,** Balf. f. et Forrest.

Species Sectionis Nivalis habitu et forma hibernaculi ad *P. limbatum,* Balf. f. et Forrest spectans a qua facile distinguitur ; foliis tenuioribus papyraceis majoribus ad 14 cm. longis 4 cm. latis apice plerumque rotundatis leviter regulariter dentato-crenulatis subtus sparsim glandulis farini-potentibus praeditis haud limbatis.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,217.** July 1917.

149 **Primula sinoplantaginea,** Balf. f.

Species Sectionis Nivalis floribus paullo praecocioribus, squamis membranaceis vaginalibus rubescentibus hibernaculi recti ad 5 cm. longi sub anthesi persistentibus. Folia lanceolata acuta in petiolum alatum membranaceum attenuata obscure crenulata ; subtus leviter flavido-farinosa. Scapus crassus ad 16 cm. longus folia paullo superans leviter flavido-farinosus umbellam plurifloram gerens ; bracteae atropurpureae intus farinosae a basi lata acuminatae pedicellos farinosos ad 2 cm. longos superantes vel subaequantes. Calyx atropurpureus tubum corollinum latum plerumque subaequans ad medium vel ultra fissus. Corolla saturate purpurea. Genitalia longiora plerumque calycem aequantia.

N.W. Yunnan. Bei-ma-shan. Forrest. **16,440.** July 1918.

Primula sinopurpurea, Balf. f.

Species Sectionis Nivalis floribus et foliis coaetaneis vel floribus paullo praecocioribus hibernaculi squamis sub anthesi a basi explanatis. Folia ad 28 cm. longa 4 cm. lata subcarnosula oblongo-ovalia obtusa vel acuta subintegra vel obscure crenulato-denticulata in petiolum alatum aequilongum vel breviorem attenuata ; subtus plus minusve aureo-farinosa. Scapus crassus ad 40 cm. longus praecipue apicem versus aureo-farinosus ; umbella pluriflora ; bracteae a basi lanceolatae acuminatae pedicellis dense aureo-farinosis ad 2.5 cm. longis multo breviores. Calyx brunneus vel brunneo-purpureus ad medium vel ultra fissus intus aureo-farinosus tubo corollino brevior. Corolla saturate purpurea. Genitalia longiora calycem superantia nunc tubum corollinum subaequantia.

Mid and N.W. Yunnan. Tali to Chungtien and the Mekong-Salween divide. Delavay. **750, 751.** May 1884. Forrest. **2128.** May 1906.

1674 **Primula stragulata,** Balf. f. et Forrest.

Caespitosa stragulum densum compactum rosularum florentium faciens, efarinosa sed ubique glandulis farini-potentibus

minute roridula. Folia petiolata vix 1 cm. longa; lamina petiolum aequans ad 4 mm. lata supra medium profunde incisa infra medium integra cuneatim in petiolum attenuata, pallide viridis utrinque concolor. Scapus tenuis circ. 1.5 cm. longus (sub fructu auctus) uniflorus rarissime biflorus bracteas 2 parvulas inaequales apicem versus gerens; pedicellus fere nullus. Calyx purpurascens ad medium fissus; lobi oblongi apiculati univenii. Corolla saturate purpureo-rosea circ. 1.5 cm. longa; tubus intus barbatus calycem duplo superans; limbus patens; lobi bipartiti. Genitalia longiora ad os corollae. Species Sectionis Bellae.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,893.** Aug. 1919.

1831 **Primula tribola,** Balf. f. et Forrest.

Rhizoma longum hibernaculo gemmae bulboso. Folia ad 13 cm. longa 2.5 cm. lata oblongo-ovalia apice rotundata undulato-crenulata in petiolum attenuata; supra atroviridia nitentia; subtus flavido-farinosa costa media rubro-purpurea. Scapus folia aequans; umbella 2–4-flora; bracteae vix 5 mm. longae ovatae; pedicelli stricti ad 1.5 cm. longi. Calyx atro-purpureus intus farinosus. Corollae roseo-purpureae griseo-flavido-oculatae tubus calycem duplo superans; lobi obovati bifidi apiculo prominulo. Capsula ovoidea circ. 1 cm. longa calycem duplo superans. Species e phylo *P. callianthae*, Franch.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **18,164.** July 1919.

1903 **Primula triloba,** Balf. f. et Forrest.

Herba parvula efarinosa glandulosa vix 2 cm. alta pulvinatim ad 1 dm. patens. Ramuli breves foliis praeteritis siccis dense vestiti. Folia vix 1 cm. longa late petiolata; lamina circ. 3.5 mm. longa et lata petiolo multo brevior ad medium triloba lobis ovatis obtusis subcarnosula utrinque laete viridis et pilis brevibus farini-potentibus conspersa margine pilis longis glandulosis ciliata; petiolus ligulatus membranaceus. Flores immersi. Scapus brevis circ. 3 mm. longus glanduloso-pilosus unibracteatus; bractea linearis acuta uninervia glanduloso-pilosa. Calyx viridis glanduloso-pilosus ultra medium 5-lobatus; lobi lanceolati acuti vel acuminati. Corolla rosea luteo-oculata in flore longistylo circ. 1.3 cm. longa; tubus latus extus glanduloso-pilosus intus ad faucem dense pulvinatim villosus; lobi obcordati profunde bifidi segmentis obtusis. Stamina in flore longistylo ad basim tubi corollini inserta. Ovarium globosum; stylus

longus tubum corollinum subaequans ; stigma capitatum inter pilos faucis prolatum. Capsula calyce ex toto inclusa ad apicem crustacea ibique valvis 5 brevibus dehiscens, infra membranacea. Semina minutissima. Species Sectionis Bellae.

S.E. Tibet. Tsarong, on the Londre-shan. Forrest. **16,878.** Aug. 1918.

1749 **Primula tsarongensis,** Balf. f. et Forrest.

Rosulata foliis floribusque coaetaneis. Folia petiolata ad 20 cm. longa erecta ; lamina papyracea lanceolata vel elongato-lanceolata circ. 12 cm. longa 2.5 cm. lata, apice rotundata et cum margine crenulato ciliata, deorsum in petiolum longe attenuata ; supra opaca puberula ; subtus pallidior subglauca glabra (costa media basi pilis paucis albis conspersa excepta) ; petiolus lamina paullo brevior alatus sparsim pilosus. Scapus validus erectus ad 40 cm. longus luteo-farinosus (sub inflorescentia densius) spicam crassam pileo purpureo florum juvenilium coronatam gerens ; flores deflexi ; bracteae inferiores ligulatae vel lanceolatae calycem subaequantes plus minusve luteo-farinosae glanduloso-ciliatae ; pedicelli nulli ; anthopodium nullum. Calyx campanulatus ventricosus circ. 4 mm. longus deflexus luteo-farinosus ultra medium 5-fissus ; lobi glanduloso-ciliati. Corolla intense purpureo-caerulea tubulosa cylindrica circ. 1.3 cm. longa extus glabra ; limbus infundibuliformis efarinosus ; lobi erecti circ. 1.5 mm. longi obovati vel subquadrati paullo emarginati. Stamina in flore brevistylo ad faucem tubi corollini inserta. Ovarium globosum operculo crustaceo coronatum ; stylus brevis calycem subaequans ; stigma discoideum depressum. Species Sectionis Muscarioidis.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **14,805.** Sept. 1917.

Primula umbratilis, Balf. f. et Cooper.

Parva rosulata foliis floribusque coaetaneis. Folia petiolata ad 9 cm. longa (sub fructu longiora) ; lamina oblonga vel subelliptica ad 4 cm. longa 2 cm. lata, apice obtusa vel rotundata, margine arcte et breviter lobulata, lobulis rotundatis vel dentiformibus, basi subtruncata et subcuneatim in petiolum angustata ; supra rugulosa atroviridis ; subtus vix pallidior reticulatim alveolaris ubique hirsuta pilis strictis glutinosis ; petiolus pilosus paullo alatus laminam subaequans vel ea longior. Scapus circ. 8 cm. longus (sub fructu ad 12 cm.) tenuis atroviridis pilis strictis pilosus efarinosus capitulum brunneo-coronatum parvum 5–6-florum floribus deflexis gerens ; bracteae inferiores circ. 5 mm. longae ligulatae virides. Calyx cupularis deflexus

ventricosus extus glaber intus plus minusve farinosus 5-partitus ; lobi glanduloso-ciliati. Corolla pallide purpurea circ. 1.5 cm. longa ; tubus angustus intus glaber, extus apicem versus glandulis farini-potentibus indutus, supra in limbum aperte infundibuliformem intus glabrum expansus ; lobi rotundati circ. 4 mm. longi adscendentes emarginati obscure denticulati. Stamina in flore brevistylo ad faucem tubi corollini inserta antheris fere exsertis, in longistylo infra medium calyce breviora ; antherae luteae. Ovarium globosum ; stylus brevis ad medium tubi corollini attingens, longus tubum aequans ; stigma magnum capitatum. Capsula pallide ochracea laevis calyce inclusa circ. 4.5 mm. longa ab apice valvis 5 per partem superiorem crustaceam dehiscens. Species Sectionis Muscarioidis.

Bhutan. Kurmathang Pumthang. Cooper. **2134.** 24th Sept. 1914.

Omphalogramma Coxii, Balf. f.

Folia petiolata oblongo-cordiformia utrinque glandulosa et pilis elongatis glanduliferis obtecta margine undulata ; petiolus dense pilosus. Scapus brevis ad 12 cm. longus ante folia evolutus pubescens. Calyx pubescens circ. 1.2 cm. longus 6-partitus ; lobi attenuatim ligulati. Corolla purpureo-kermesina parva ad 3 cm. longa ; lobi vix 7 mm. longi ovato-rotundati apice dentati. Staminum filamenta glandulosa. Stylus glaber. Species *O. Delavayi*, Franch. affinis.

N.E. Burma. Chimili Alps. Farrer and Cox. **1187.** Aug. 1919.

1123 **Omphalogramma Farreri,** Balf. f.

Folia petiolata rotundato-cordiformia ; lamina ad 10 cm. diam. glandulosa et sparsim pilosa (ad venas infra dense) ; petiolus ad 16 cm. longus dense lanatus. Scapus robustus circ. 16 cm. longus ante folia evolutus pubescens. Calyx circ. 1.7 cm. longus viridis pubescens 6-partitus ; lobi ligulati. Corolla saturate purpurea ad 5 cm. longa ; lobi circ. 1.5 cm. longi ovales dentati. Staminum filamenta glandulosa. Stylus basi glandulosus pilosus. Species *O. Delavayi*, Franch. affinis.

N.E. Upper Burma. Hpimaw and Chimili High Alps. Farrer and Cox. **1053, 1169.** June 1919.

1125 **Omphalogramma Forrestii,** Balf. f.

Planta floribus cum foliis nascentibus et gemmae hibernaculo magno. Foliorum haud pubescentium lamina ovata vel oblongo-elliptica cordulata abrupte et longe petiolata. Scapus longus.

Flos magnus subzygomorphus. Corollae ad 7 cm. longae tubus flavidus; limbus saturate purpureus; lobi leviter crenulati. Staminum filamenta glandulosa. Stylus glaber. In Sectione Omphalogramma *O. Souliei*, Franch. (*Primulae Franchetii*, Pax) proxima.

Eastern N.W. Yunnan. Mts. of the Chungtien plateau. Forrest. **10,666.** July 1913.

Rhododendron :
Diagnoses Specierum Novarum.

BY

PROFESSOR BAYLEY BALFOUR, F.R.S.

I.

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,, yaragongense, Balf. f., p. 64. Lapponicum.

4679 **Rhododendron admirabile,** Balf. f. et Forrest.

Frutex ad 3.5 m. altus. Rami subcrassi primo albido-ceracei. Perulae glutinosae. Folia pallide viridia coriacea petiolata ad 15 cm. longa 3 cm. lata lanceolata vel oblanceolata, apice brevissime acuminata, margine cartilaginea, basi subcuneata vel obtusa ; supra subnitentia laevia vel paullo reticulata glaberrima, costa media sulcata, venis primariis utrinsecus ad 22 paullo sulcatis ; subtus nitentia glaberrima ceracea costa media et venis primariis elevatis, venulis ultimis minute reticulatis (reticulo immerso) ; petiolus plus minusve ceraceus ad 1.5 cm. longus. Umbella racemosa circ. 10-flora rhachi lanata ad 2 cm. longa ; pedicelli glabri circ. 1.5 cm. longi. Calyx parvus glaber. Corolla tubuloso-campanulata ad 4.5 cm. longa saturate rosea emaculata vel sparsim maculata postice varo basali notata ; lobi 5 lati undulati emarginati. Stamina 10 inaequalia corolla multo breviora ; filamenta glabra. Discus minutissime puberulus. Gynaeceum corollam superans ; ovarium angustum

cylindricum truncatum glaberrimum circ. 8 mm. longum ; stylus glaber exsertus. Species Seriei Irrorati ex affinitate *Rh. gymnanthi,* Diels.

S.W. Szechwan. Mu-li Mts. Forrest. **16,378.** June 1918.

4676 **Rhododendron adoxum,** Balf. f. et Forrest.

Species ramis crassis juvenilibus sparsim glandulosis adultis glabris. Folia coriacea oblongo-ovalia ad 11 cm. longa 5 cm. lata apice rotundata mucronata, basi rotundata inaequalia ; supra atro-olivacea nunc purpurascentia glabra ; subtus sordide olivacea ; petiolus ad 2.5 cm. longus glabrescens. Umbella 10–12-flora ; pedicelli inaequales circ. 2 cm. longi glandulosi et floccosi. Calyx fere obsoletus undulatus carnosulus glandulosus. Corolla alba roseo-suffusa infundibuliformi-campanulata ad 4 cm. longa sparsim maculata glabra 7-loba ; lobi obovati emarginati. Stamina 14 corolla multo breviora ; filamenta glabra. Discus glaber. Ovarium glandulosum ; stylus corolla brevior ex toto glandulosus. Forsan *Rh. habrotricho,* Balf. f. et W. W. Sm. aff.

N.W. Yunnan. Yunling Mts. Forrest. **15,226.** July 1917.

4677 **Rhododendron adroserum,** Balf. f. et Forrest.

Frutex ad 3.5 m. altus. Rami subcrassi primo cerae strato albido cinerascente vestiti dein glaucescentes demum nudi. Folia petiolata coriacea obovato-oblonga ad 11 cm. longa 3 cm. lata, apice rotundata et rostratim apiculata nunc apicem versus attenuata breviterque acuminata, margine paullo recurva subcrenulata, basi obtusa vel subcuneata ; utrinque pallide viridia et subnitentia ceracea ; supra vix alveolo-reticulata glaberrima, costa media sulcata et venis primariis paullo sulcatis utrinsecus ad 18 fere horizontalibus ; subtus saepe fulvida glaberrima costa media flavido-albida elevata et venis primariis prominulis caeteroquin laevia venularum reticulo immerso ; petiolus circ. 1 cm. longus plus minusve albido-ceriferus. Flores in racemo-umbellas circ. 10-floras dispositi, rhachi circ. 1 cm. longa ceracea ; pedicelli glabri ad 1.5 cm. longi rubescentes. Calyx parvus 5-lobus ; lobi submembranacei rotundati vel late ovati circ. 1.5 mm. longi margine erosi. Corolla infundibuliformi-campanulata circ. 3.5 cm. longa tubo pallido sursum in limbum saturate roseum ampliato multi-maculata postice varo basali notata extus intusque glabra 5-loba ; lobi lati emarginati. Stamina 10 inaequalia corolla breviora ; filamenta glabra. Discus glaber. Gynaeceum corollam subaequans ; ovarium tenue cylindricum glabrum ; stylus glaber. Species Seriei Irrorati.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **16,353.** April 1917.

Rhododendron agetum, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Rami recti glabri sed vestigiis indumenti juvenilis cinereis sparsim notati, seniores albido-grisei. Folia longe petiolata ad 7.5 cm. longa per annos duos persistentia ; lamina crasse coriacea anguste oblonga, mucrone prominulo rostrato-apiculata, margine recurva, basi obtusa saepe inaequalis ; supra laete viridis laevis glabra, costa media anguste sulcata, venis primariis vix conspicuis utrinsecus 20 pinnatim dispositis ; subtus glauco-albida reti venularum ultimarum elevato minute alveolata ubique papillis epidermicis ceriferis longis baculiformibus contiguis induta et venis primariis sepultis pinnatim albo-striata, costa media elevata epapillata roseo-tincta floccosa percursa ; petiolus ad 1.5 cm. longus roseo-tinctus ut rami vestitus. Umbella ad 4-flora ; pedicelli circ. 1 cm. longi sparsim floccosi. Calyx parvus circ. 2 mm. longus flavido-viridis cupularis submembranaceus margine undulatus vel in lobos breves semilunatos esculptus dorso glaber fimbriato-ciliatus. Corolla kermesino-coccinea tubuloso-campanulata ad 3.5 cm. longa 5-loba basi gibbosa ibique variculosa glabra ; lobi rotundati emarginati. Stamina 10 inaequalia ad 2.5 cm. longa corolla gynaeceoque multo breviora ; filamenta glabra. Discus glaber. Gynaeceum corollam aequans vel ea paullo longius ; ovarium conoideum in stylum subattenuatum dense floccosum tomentosum ; stylus basi floccosus. Species ex affinitate *Rh. neriiflori,* Franch.

Western Yunnan. Eastern flank of N'Maikha-Salween divide. Forrest. **17,851.** May 1919.

Rhododendron asmenistum, Balf. f. et Forrest.

Frutex ad 1 m. altus. Rami tenues eglandulosi indumenti vestigiis albidis plus minusve notati. Perulae fugitivae. Folia petiolata ad 8 cm. longa ; lamina coriacea oblanceolata vel anguste obovalis ad 7.5 cm. longa 2 cm. lata, apice obtusa mucronata, margine paullo recurva, deorsum attenuata basi subcuneata saepe inaequalis ; supra olivacea glabra laevis costa media et venis primariis utrinsecus circ. 8 rubidis sulcatis ; subtus grisea costa media et venis primariis elevatis rubro-lineata glandulis paucis praedita, indumento persistente scintillante laevi subalveolari e pilis rosulatis constructo vestita, rosulis aliis parvis fere sessilibus aliis longe ramosis haud intricatim intertextis ; petiolus ut rami vestitus circ. 5 mm. longus. Umbella ad 6-flora ; pedicelli circ. 2 cm. longi puberuli et floccis sebaceis parvis conspersi. Calyx ad 1 cm. longus

5-partitus ; cupula brevis ; lobi rotundati vel ovati nunc lobati saepe reflexi flavidi extus glabri margine sebaceo-ciliati. Corolla alba roseo-tincta campanulata ad 3.5 cm. longa ; lobi rotundati emarginati. Stamina 10 inaequalia longiora gynaeceum fere aequantia ; filamenta glabra. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium pilis adpressis adscendentibus albidis et rufescentibus tomentosum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **19,169.** July 1919.

4680 **Rhododendron astrocalyx,** Balf. f. et Forrest.

Frutex flaviflorus ad 1.5 m. altus. Rami nodulati primo glandulosi mox glabri. Folia coriacea elliptica ad 7 cm. longa 3.5 cm. lata mucronulata basi rotundata subtrunculata ; supra glabra purpureo-olivacea (costa media excepta) ; subtus subfulva pilis caulifloris et glandulis paucis praedita ; petiolus 1–1.5 cm. longus glandulosus. Umbella 7–8-flora ; pedicelli sparsim glandulosi. Calyx ad 6 mm. longus ruber ; cupula glandulosa ; lobi 5 stellatim patentes membranacei circ. 3 mm. longi obtusi glandulosi. Corolla pallide flava aperte campanulata circ. 2.5 cm. longa postice extus glandulosa intus puberula. Stamina corolla breviora ; filamenta brevissime puberula. Discus sub ovario puberulus. Ovarium stipitatum glandulosum ; stylus fere ex toto stipitatim glandulosus. Species Seriei Souliei.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,128.** June 1917.

4681 **Rhododendron axium,** Balf. f. et Forrest.

Frutex ad 1.5 m. altus. Rami tenues glandulis rubris subsetulosis dense vestiti. Folia papyracea oblongo-ovalia vel oblonga vel obovalia ad 9 cm. longa (petiolo 1–1.5 cm. longo glandulis longe stipitatis dense praedito incluso) 3.8 cm. lata, apice late obtusa apiculata, basi rotundata ; supra atro-olivacea glabra ; subtus subfulvida pilis sebaceis aurantiacis conspersa. Umbella 4–6-flora ; pedicelli tenues circ. 1.5 cm. longi dense glandulosi glandulis longe stipitatis. Calyx parvus carnosulus margine undulatus vel leviter 5-dentatus dense glandulosus. Corolla infundibuliformi-campanulata circ. 3.5 cm. longa roseo-suffusa varo magno kermesino basali notata glabra 5-loba. Stamina corolla paullo breviora puberula. Discus puberulus. Ovarium glandulosum glandulis breviter stipitatis ; stylus stamina longiora aequans basi infima sparsim glandulosus. Species Seriei Souliei.

S.E. Tibet. Doker-la, Mekong-Salween divide. Forrest. **16,684.** June 1918.

Rhododendron batangense, Balf. f.

Frutex parvifolius multiramosus ramis incrementum annuum breve exhibentibus. Ramuli annotini circ. 1 mm. diam. rufi indumento asperato squamarum peltatarum secretione rubra impletarum dense induti seniores nigricantes tandem sordide grisei decorticantes. Alabastra foliaria ovoidea parva pauciperulata ; perulae extimae minutae coriaceae elongato-triangulares circ. 1.5 mm. longae obtusae dorso dense lepidotae ciliatae, intermediae late ovatae circ. 2 mm. longae apiculatae carinatae margine membranaceae ciliatae intus sericeae extus lepidotae et puberulae, intimae membranaceae late ovales vel obovatae mucronulatae cucullatae circ. 4 mm. longae ut exteriores indutae. Folia petiolata ad 1 cm. longa ; lamina crasse coriacea oblonga vel longe ovalis vel obovalis nunc breviter ovata ad 8 mm. longa 2.5 mm. lata, apicem versus paullo attenuata obtusa, margine paullo recurvata, basi obtusa vel late obtusa nunc attenuata ; supra atroviridis opaca squamis peltatis arescentibus concavis contiguis quasi foveolatim lepidota, squamarum umbone lato secretione aurantiaca vel rufa pleno, instita aequilata integra albida ; subtus fulvida et rufo-punctulata indumento squamarum contiguarum bicoloratarum dense vestita ; petiolus ad 2 mm. longus ut caulis lepidotus. Flores solitarii terminales fere sessiles ; bracteae sub anthesi plus minusve persistentes exteriores crustaceae rotundatae circ. 3 mm. longae intus sericeae extus lepidotae pilis niveis lanato-ciliatae, interiores membranaceae cucullatae late ovales vel ellipticae circ. 6 mm. longae 4 mm. latae, intimae cuneatae truncatae ut exteriores indutae ; pedicelli vix 0.5 mm. longi dense lepidoti. Calyx minutissimus cupularis vix 0.5 mm. longus lobos 5 exhibens ; lobi subaequales carnosuli semilunati vel suborbiculares extus dense lepidoti epilosi corollae adpressi. Corolla rosea circ. 9 mm. longa extus elepidota ; tubus campanulatus circ. 2.5 mm. longus intus glaber in limbum patentem 5-lobatum ampliatus ; lobi oblongi vel ovales vel elliptici undulati tenues circ. 6 mm. longi ad 5 mm. lati. Stamina 10 inaequalia alternatim longiora et breviora, corolla breviora, longiora ad 7 mm. longa breviora circ. 6 mm. longa ; filamenta pallide rosea deorsum paullo expansa glabra vel pilis paucis supra basim sparsissime conspersa. Discus puberulus. Gynaeceum circ. 6 mm. longum staminibus longioribus paullo brevius ; ovarium breviter ovoideum sulcatum circ. 2 mm. longum squamis flavido - viridibus epilosum dense imbricatim lepidotum ; stylus purpureo-roseus rectus glaber ad apicem paullo clavatus ; stigma lobulatum angustum labio cinctum. Species Seriei Lapponici *Rh. ramosissimo,* Franch. affinis.

W. Szechwan. Principality of Batang. Yaragong. Soulié. **3304.** June 1903. In Herb. Paris.

4622 **Rhododendron beimaense,** Balf. f. et Forrest.

Frutex ad 2 m. altus. Rami tenues sparsim glandulosi demum verruculosi. Folia petiolata ad 11 cm. longa ; lamina papyracea elliptica vel ovalis ad 8.5 cm. longa 5.5 cm. lata apice rotundata mucronulato-apiculata, basi rotundata ; supra viridis opaca glabra ; subtus pallide viridis pilis plurimis sebaceis aurantiacis induta ; petiolus circ. 2.5 cm. longus sparsim glandulosus. Umbella 5–6-flora ; pedicelli tenues stricti breviter glandulosi. Calyx parvus 5-lobus ; lobi rotundati circ. 1.5 mm. longi carnosuli dense breviter glandulosi. Corolla aperte pateriformis circ. 3 cm. longa alba roseo-suffusa maculis paucis et varo basali notata glabra 5-loba. Stamina corolla paullo breviora ; filamenta puberula. Discus puberulus. Gynaeceum corollam aequans ; ovarium breviter glandulosum ; stylus fere glaber. Species Seriei Selensis.

N.W. Yunnan. Bei-ma-shan. Forrest. **13,951.** June 1917.

4623 **Rhododendron brachyandrum,** Balf. f. et Forrest.

Frutex circ. 1 m. altus. Rami crassiusculi glandulosi nunc per annos duos perulati. Perulae glandulosae. Folia breviter petiolata ad 12 cm. longa ; lamina crasse coriacea oblonga nunc apicem versus paullo latior ad 11 cm. longa 3.5 cm. lata, apice rotundata breviter mucronata, basi obtusa vel subrotundata ; supra laete viridis laevis glabra, costa media paullo sulcata, venis primariis utrinsecus circ. 8 fere occultis ; subtus pallide flavido-viridis venularum reticulo prominulo saepe rufo-tincto, costa media elevata, venis primariis occultis, pilis sebaceis nunc rufis conspersa et ad latera costae mediae pilosa ; petiolus atro-purpureus glaber ad 1 cm. longus. Umbella breviter racemosa rhachi glabra ; bracteae internae sericeae ; pedicelli circ. 8 mm. longi glabri atro-purpurei sub calyce expansi. Calyx circ. 6 mm. longus ad medium 5-lobus glaber ; cupula basi atro-kermesina ; lobi rotundati vel elliptici vel oblongi membranacei cinerei. Corolla tubuloso-campanulata 5-loba circ. 3.5 cm. longa plus minusve kermesina et fere ad apicem loborum maculata basi gibbosa ibique 5-varosa glabra. Stamina brevissima subaequalia circ. 1.2 cm. longa antheris infra medium tubi corollini circum stylum aggregatis ; filamenta glabra. Discus glaber. Gynaeceum circ. 2 cm. longum corolla multo brevius ; ovarium dense et breviter glandulosum ; stylus glaber.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,943.** July 1919.

Rhododendron brunneifolium, Balf. f. et Forrest.

Frutex ad 1 m. altus. Rami stricti tenues tuberculati esetulosi sparsissime glandulosi et floccosi. Alabastra fusiformia ; perulae exteriores subtomentosae. Folia petiolata ad 8 cm. longa ; lamina oblongo-ovalis ad 7 cm. longa 3 cm. lata, apice rotundata minute apiculata, margine plana, basi obtusa ; supra olivacea glabra ; subtus subfulvida indumento pilorum rosulatorum tenui laxo unistrato vestita, costa media venisque primariis utrinsecus circ. 11 paullo elevatis ; petiolus ad 1 cm. longus sparsissime glandulosus et floccosus. Umbella 3–4-flora ; pedicelli ad 3 cm. longi tenues ut petiolus vestiti. Calyx parvus cupularis carnosulus dorso subglaber margine subinteger pilis sebaceis ciliatus. Corolla roseo-kermesina emaculata tubuloso-campanulata ad 4 cm. longa glabra 5-loba ; lobi lati sub-bifidi. Stamina longiora corollae tubum subaequantia ; filamenta puberula. Discus puberulus. Gynaeceum corollam subaequans ; ovarium dense albido-floccosum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Kiu-chiang divide. Forrest. **19,025.** July 1919.

Rhododendron Bureavioides, Balf. f.

Frutex ad 3 m. altus. Rami crassi indumento denso pallide brunneo e pilis rigidis longe stipitatis breviterque ramosis et glandulis rubris constructo involuti. Folia breviter petiolata ad 15 cm. longa ; lamina crasse coriacea elongato-ovalis ad 14 cm. longa 5 cm. lata subrostrata, basi late rotundata ; supra atro-olivacea subnitens indumenti vestigiis plus minusve notata ; subtus rubro-ferruginea indumento crasso persistente molli lanato e pilis longis fibrilliformibus multi-ramosis acutis undulatis intertextis haud cirrhosis vestita ; petiolus crassus circ. 1 cm. longus ad 5 mm. diam. ut rami vestitus. Umbella densa multiflora sub anthesi bracteis bracteolisque cincta ; bracteae extimae ferrugineo-lanatae, interiores sericeae ; bracteolae lineares pedicellis multo breviores ; pedicelli crassi circ. 1.5 cm. longi lanati et glandulosi. Calyx circ. 8 mm. longus 5-partitus ; lobi anguste oblongi circ. 2 mm. lati rufo-glandulosi et floccosi. Corolla circ. 4 cm. longa campanulata postice rubro-varosa emaculata extus glabra intus pubescenti-glandulosa. Stamina 10 inaequalia corolla gynaeceoque multo breviora ; filamenta puberula. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium glandulosum epilosum ; stylus basi infima glandulosus. Species Seriei Edgeworthii.

Western China. Wilson. **3954.** June 1904. In Herb. Kew.

Western China. Tatsien-lu. Wilson. **3959=1538.** May 1904. In Herb. Kew.

4626 **Rhododendron burriflorum,** Balf. f. et Forrest.

Frutex ad 4.5 m. altus. Rami subcrassi primo glandulosi (glandulis saepe longe stipitatis) et rufo-floccosi glabrescentes estrigillosi. Folia petiolata ovalia vel oblongo-ovalia nunc obovalia ad 16 cm. longa 5.5 cm. lata obtusa mucronata vel rostrato-apiculata, margine plana paullo undulata, basi rotundata ; supra atro-olivacea sublaevia glabra (costa media sparsim glandulosa et floccosa excepta) venis primariis utrinsecus ad 14 occultis ; subtus pallide fulva costa media elevata sparsim glandulosa et floccosa, venis primariis et reti ultimo venarum rubidis haud prominulis, caeteroquin papillis epidermicis ceriferis vestita ; petiolus ad 2 cm. longus stipitatim glandulosus et floccosus. Flores in umbellam breviter racemosam circ. 8-floram dispositi, rhachi circ. 1 cm. longa glandulosa et floccosa ; bracteae fertiles dense sericeae ; bracteolae breves subulatae pilosae ; pedicelli circ. 1.5 cm. longi dense floccoso-tomentosi et sparsim glandulosi. Calyx ampliatus submembranaceus ad 2 cm. longus rubro-coloratus spathaceo-dimidiatus inaequaliter lobatus infra glaber superne sparsim puberulus margine pilis sebaceis ciliatus. Corolla campanulata saturate kermesina coccineo-maculata et varo basali notata ad 4 cm. longa extus intusque glabra septis incompletis interpetalinis basim versus praedita 5-loba ; lobi lati emarginati. Stamina 10 inaequalia corollam vix aequantia ; filamenta tenuia basi puberula. Discus puberulus. Gynaeceum stamina aequans ; ovarium cylindrico-conoideum sulcatum truncatum pilis sebaceis et glandulosis dense floccoso-tomentosum ; stylus in triente infimo floccosus et glandulosus. Species *Rh. habrotricho,* Balf. f. et W. W. Sm. affinis sed setulae strigillosae desunt.

Western Yunnan. Shweli-Salween divide. Forrest. **17,598.** June 1918.

4637 **Rhododendron caeruleo-glaucum,** Balf. f. et Forrest.

Frutex parvifolius ad 4 dm. altus erecto-ramosus. Ramuli tenues squamis carnosulis rufescentibus conspersi demum verruculosi. Perulae persistentes. Folia breviter petiolata ad 2 cm. longa ad apicem ramulorum rosulata primo utrinque speciose caeruleo-glauca tandem viridia ; lamina coriacea obovata ad 1.7 cm. longa 7 mm. lata, apice rotundata nunc subretusa breviter mucronulata, margine crenulato-undulata recurva squamis carnosulis fimbriata, deorsum attenuata basi subcuneata; supra (foliis adultis) pallide olivacea nitens breviter papillata glabra sed squamarum vestigiis obscure sparsimque notata, costa media sulcata ; subtus flavido-viridis papillis epidermicis subscintillans squamis carnosulis paucissimis marcidis conspersa ;

petiolus circ. 3 mm. longus ut ramuli vestitus. Flores magni terminales solitarii vel bini nutantes ; pedicelli validi ad 6 cm. longi saturate purpurei glabri nunc squamis paucis praecipue ad apicem praediti sub calyce expansi. Calyx cupularis circa corollae basim ampliatus patens atro-kermesinus ad 5 mm. longus ; cupula glabra ; lobi 5 ovales glabri eciliati. Corolla campanulata ad 2.3 cm. longa saturate roseo-purpurea ad trientem vel ultra 5-loba intus puberula ; lobi rotundati fere integri. Stamina 10 alternatim longiora et breviora tubum corollae aequantia ; filamenta basi expansa dense puberula ; antherae magnae aurantiacae. Discus glaber. Gynaeceum corollam aequans ; ovarium ovoideum circ. 3 mm. longum squamis siccis conspersum ; stylus atropurpureus rectus nunc paullo declinatus sub stigmate lobulato dilatatus. Species ex phylo *Rh. campylogyni*, Franch.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **19,181.** July 1919.

Rhododendron calostrotum, Balf. f. et Ward.

Frutex parvulus prostratus. Rami juveniles ad 1 mm. diam. indumento ramentaceo flavido imbricatim vestiti squamis plurimis longe stipitatis, postea rufescentes demum cinerei stipitibus squamarum hic et illic subsetulosi. Folia petiolata ad 2.5 cm. longa ; lamina coriacea ovalis vel elliptica ad 2.2 cm. longa 1 cm. lata apice rotundata nunc retusa mucrone minuto plerumque depresso, margine recurva setuloso-ciliata, basi obtusa ; supra in foliis juvenilibus pallide viridis squamis albidis discontigue lepidota, intervallis diametro squamarum minoribus, postea atro-viridis squamis scintillantibus ; subtus primo flavido-roseo-suffusa demum mahogani-rubra imbricatim lepidoti uniformiter punctulata squamis stipitatis alias subsessiles superantibus ; petiolus circ. 3 mm. longus ut rami vestitus. Flores singuli vel bini terminales ; pedicellus circ. 1.5 cm. longus tenuis squamis albidis stipitatis et subsessilibus dense indutus. Calyx ad 8 cm. longus 5-partitus ; cupula dense albido-pilosa sparsim lepidota ; lobi rubri ovati obtusi dorso puberuli apicem versus ad medium lepidoti, margine ciliati. Corolla aperta purpureo-rosea postice maculis linearibus notata ad 2 cm. longa extus dense puberula ; lobi lati rotundati subcrenulati. Stamina 10 corolla gynaeceoque multo breviora ; filamenta supra basim brevem nudam villosula. Gynaeceum corolla brevius ; ovarium petasiforme parvum viride imbricatim lepidotum ; stylus glaber. Species Seriei Saluenensis.

N.E. Upper Burma. Ridge of Naung-Chaung, Mwai divide. Kingdon Ward. **1790.** 16th July 1914.

Rhododendron catapastum, Balf. f. et Forrest.

Frutex virgatus ad 2.5 m. altus. Rami juveniles tenues circ. 2 mm. diam. brunnei subrussati squamis imbricatis furfuracei demum glabrescentes. Folia petiolata ad 10.5 cm. longa ; lamina chartacea ovalis ad 8 cm. longa 4.5 cm. lata, breviter acuminata tenuiter mucronulata, margine plana, basi late obtusa vel subrotundata ; supra olivacea subaenotincta laevis nitens squamis contiguis albidis marcidis induta, costa media paullo sulcata minutissime puberula, venis primariis utrinsecus 8–10 inconspicuis ; subtus cervina saepe demum rubiginosa nitida laevis squamis magnis sigilliformibus contiguis induta hic et illic squama majore intensius colorata punctulata, costa media elevata erubescente dense lepidota ; petiolus ad 1.5 cm. longus ut rami vestitus. Umbellae 4–5-florae solitariae nunc 2–3-fasciculatae ; pedicelli sub fructu ad 2 cm. longi sigillatim lepidoti. Flos marcidus solum visus. Calyx cupularis carnosulus circ. 2 mm. longus extus furfuraceus margine lobos 5 semilunatos vel rotundatos gerens. Corolla tubuloso-campanulata kermesino-maculata extus lepidota intus glabra. Staminum filamenta puberula. Discus puberulus. Ovarium imbricatim lepidotum ; stylus glaber. Capsula circ. 1.2 cm. longa 4 mm. diam. recta vel paullo curvata sulcata lepidota ab apice 5-valvis. Species Seriei Heliolepidis.

W. Yunnan. Yung-peh Mts. Forrest. **16,597.** July 1918. Also **16,597A.**

Rhododendron cerochitum, Balf. f. et Forrest.

Frutex ad 6 m. altus. Rami virgati elongati glauci sparsim floccosi glabrescentes. Folia petiolata ad 15 cm. longa 4 cm. lata coriacea lanceolata vel oblongo-lanceolata vel oblonga apice rostrato-acuta mucronata, margine undulata subcrenulata, basi obtusa vel late cuneata ; supra glauca opaca sed cerae particulis minutis nitentibus praedita alveolo-reticulata ; subtus ceracea nitentia costa media elevata venis primariis utrinsecus circ. 16–20 patulis cum venulis ultimis reticulatim prominulis percursa rubro-punctata ; petiolus circ. 1.5 cm. longus plus minusve floccosus. Flores in racemo-umbellam ad 7-floram dispositi, rhachi griseo-ceracea circ. 1 cm. longa ; pedicelli breves griseo-ceracei circ. 8 mm. longi. Calyx parvus ; lobi deltoidei floccoso-fimbriati. Corolla infundibuliformi-campanulata ad 5 cm. longa rosea emaculata extus glabra intus basi puberula ; lobi 5 lati emarginati. Stamina 10 inaequalia corolla et gynaeceo breviora ; filamenta basi rubra minute puberula ; antherae parvulae. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium tenue cylindricum circ. 7 mm. longum truncatum

sparsim floccosum ; stylus glaber. Capsula brevis vix 1.5 cm. longa recta. Species Seriei Irrorati.

Western Yunnan. Shweli-Salween divide. Forrest. **15,766.** June 1917. **17,484.** June 1918.

Rhododendron chameunum, Balf. f. et Forrest.

Frutex parvifolius caespitosus ad 2.5 dm. altus ramosissimus. Ramuli juveniles circ. 1 mm. diam. erecti fulvo-strigillosi breviter puberuli et sparsim lepidoti. Perulae persistentes. Folia brevissime petiolata ad 1.5 cm. longa ; lamina crasse coriacea ovalis vel obovalis ad 1.4 cm. longa 7 mm. lata, apice rotundata nunc emarginata mucrone parvo prominulo terminata, margine recurva setuloso-ciliata basi obtusa ; supra intense nigro-viridis nitens squamis albidis marcidis haud contiguis induta hic et illic et praecipue ad costam mediam sulcatam puberulam setulas fulvidas paucas emittens ; subtus cinereo-cervina uniformiter brunneo-punctulata ubique lepidota et ad costam mediam elevatam fulvido-setulosa, indumenti bistrati squamis contiguis pro parte maxima albidis institam latam translucentem integerrimam et superficiem subfoveolatam praebentibus, paucioribus umbone brunneo-infiltrato ultra alias excrescentibus punctula fingentibus ; petiolus ad 1.5 mm. longus ut rami vestitus. Flores magni pedicellati solitarii vel bini ad apicem ramulorum sub anthesi basi bracteis cucullatis late ovatis vel obovatis saepe truncatis erubescentibus ad 1 cm. longis sericeis et (extimis solum) dorso setulosis cincti ; bracteolae lineares vix 1 cm. longae pilo-cristatae ; pedicelli stricti erecti ad 2 cm. longi dense strigillosi puberuli et sparsim lepidoti. Calyx ad 6 mm. longus 5-partitus ; cupula circ. 1 mm. longa atro-kermesina squamis albidis prominulis notata puberula et setulosa ; lobi rubri ovati vel oblongo-ovales dorso puberuli margine setuloso-ciliati. Corolla saturate purpureo-rosea intense kermesino-maculata aperta circ. 2.5 cm. longa ad medium 5-lobata extus a basi puberula superne ad medium petalorum lepidota, intus pubescens ; lobi rotundati lati eroso-crenulati. Stamina 10 alterna longiora et breviora corolla gynaeceoque multo breviora ; filamenta atropurpurea supra basim brevem nudam et intra tubum corollinum dense purpureo-villosula. Discus sub ovario dense puberulus. Gynaeceum corollam aequans ; ovarium ovoideum viride dense lepidotum et puberulum ; stylus atropurpureus glaber. Capsula subglobosa calyce membranaceo omnino inclusa ad 4 mm. longa et lata sulcata puberula et lepidota. Species Seriei Saluenensis.

W. Yunnan. On the Li-ti-ping. Forrest. **13,904.** June 1917. Also **12,968, 16,143.**

4689 **Rhododendron chlanidotum,** Balf. f. et Forrest.

Frutex ramis crassiusculis dense cinereo-tomentosis. Perulae fugitivae. Folia breviter petiolata ad 10 cm. longa ; lamina coriacea oblonga vel oblanceolata vel anguste obovalis apice late obtusa vel rotundata tuberculato-mucronata, margine subplana, basi obtusa vel subrotundata ; supra atro-olivacea minute rugulosa glabra costa media sulcata venis primariis utrinsecus circ. 8 vix visis ; subtus sordide grisea indumento bistrato plerumque mycelio fuligineo interpenetrato vestita, pilis indumenti glandulis paucis mixtis, eis strati superi crassi-stipitatis et longi-ramosis superficiem sublanatam facientibus, strati inferi breviter rosulatis, costa media magna erubescente et venis primariis prominulis ; petiolus ad 8 mm. longus crassus ut rami vestitus. Umbella ad 5-flora ; pedicelli vix 2 cm. longi dense setuloso-glandulosi et pilis brevibus albidis floccosis pilosi. Calyx parvus obliquus circ. 3 mm. longus ; lobi 5 ovati vel rotundati extus ubique et ad marginem dense setuloso-glandulosi. Corolla laete lutea (immatura solum visa). Stamina parva gynaeceo multo breviora ; filamenta basi lata villosula. Discus glaber. Gynaeceum corollam subaequans ; ovarium dense setuloso-glandulosum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Ka-gwr-pw. Forrest. **16,714.** July 1918.

4049 **Rhododendron cosmetum,** Balf. f. et Forrest.

Frutex ad 1.5 m. altus parvifolius multi-ramosus. Rami erecti, tenues (ultimi circ. 1 mm. diam.) dense ferrugineo-strigillosi squamoso-lepidoti et sparsim puberuli. Folia breviter petiolata ad 1.5 cm. longa ; lamina coriacea ovalis vel oblongo-ovalis apice rotundata vel obtusa prominenter mucronulata, margine recurva setuloso-ciliata, basi obtusa ; supra atro-viridis vix rugulosa vestigialiter contigue lepidota, costa media vix sulcata puberula sparsimque setulosa ; subtus pallide viridis postea plus minusve cervina contigue lepidota uniformiter brunneo-punctulata, costa media straminea elevata sparsim lepidota et basim versus ferrugineo-strigillosa setulis plus minusve detersilibus ; petiolus circ. 2 mm. longus ut rami vestitus. Umbella terminalis biflora bracteis amplis sub anthesi persistentibus ; pedicelli stricti erecti 1.5 cm. longi pilis setuliformibus tenuibus sparsim praediti et discontigue lepidoti superne expansi. Calyx ad 6 mm. longus ultra medium 5-lobus ; cupula carnosula atro-kermesina puberula elepidota ; lobi inaequales laete rubri ovati subobtusi dorso elepidoti sparsim breviterque puberuli margine pilis rubris setulosis et pilis albidis tenuibus plurimis ciliati. Corolla purpureo-rosea postice linearimaculata aperta ad 2 cm. longa extus pilosa elepidota intus

puberula. Stamina 10 gynaeceum subaequantia vel eo paullo breviora ; filamenta supra basim glabram circ. 1 mm. longam pilis ascendentibus dense villosula. Discus puberulus. Gynaeceum corolla paullo brevius ; ovarium petasiforme circ. 2 mm. longum viride puberulum et imbricatim lepidotum ; stylus glaber. Capsula parva circ. 4 mm. longa puberula et sparsim lepidota calyce inclusa. Species Seriei Saluenensis.

N.W. Yunnan. Bei-ma-shan. Forrest. **13,985.** June 1917.

4670 **Rhododendron cremastum,** Balf. f. et Forrest.

Frutex nanus parvifolius circ. 1.5 m. altus. Rami perulati adscendentes, hornotini circ. 1 mm. diam. lepidoti, vetustiores verruculosi. Folia petiolata ad 2.4 cm. longa ; lamina coriacea obovalis vel obovata vel oblongo-ovalis 1–1.7 cm. lata, apice rotundata tuberculato-mucronulata, margine revoluta undulata, basi in petiolum attenuata ; utrinque squamis discontiguis vestita ; supra opaca margine squamis impressis seriatim notata, costa media puberula ; subtus viridis ; petiolus ad 3 mm. longus. Umbella 2–4-flora terminalis ; flores cernui ; pedicelli circ. 4 cm. longi lepidoti. Calyx purpurascens demum late patens basi lepidotus circ. 7 mm. longus ad medium 5-lobatus ; lobi rotundati glabri (margine plerumque lepidoto excepto). Corolla carnosula purpureo-rosea campaniformis extus glabra intus puberula ; lobi 5 rotundati 7 mm. lati (anterioribus 2 longioribus ad 9 mm.). Stamina 10 tubum corollinum aequantia ; filamenta subvillosa. Discus lobulatus glaber. Gynaeceum stamina aequans ; ovarium lepidotum ; stylus crassus clavatus deflexus. Species ex phylo *Rh. campylogyni*, Franch.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,266.** July 1917.

4691 **Rhododendron cyclium,** Balf. f. et Forrest.

Frutex ad 1.5 m. altus tenui-ramosus. Rami glandulosi. Folia crasse coriacea petiolata orbicularia ad 4 cm. diam. mucronata cordulata ; supra atro-olivacea glabra ; subtus purpureo-glauca profuse rubro-punctulata papillis epidermicis ceriferis vestita, costa media epilosa ; petiolus ad 1.2 cm. longus glandulosus. Umbella ad 5-flora ; pedicelli dense glandulosi. Calyx parvus ; lobi rotundati dense glandulosi. Corolla aperta campanulata ad 3 cm. longa saturate rosea extus intusque glabra ; lobi 5 lati subemarginati. Stamina 10 corolla gynaeceoque breviora ; filamenta glabra. Discus glaber. Ovarium dense glandulosum ; stylus basi infima glandulosus corollam subaequans. Species Seriei Campylocarpi.

Western Yunnan. N'Maikha-Salween divide. Forrest. **18,044.** June 1919.

3404 **Rhododendron desquamatum,** Balf. f. et Forrest.

Frutex (vel arbor parva) ad 8 m. altus. Rami epilosi dense verruculoso-lepidoti. Folia subcoriacea petiolata ovalia vel oblongo-ovalia vel oblongo-lanceolata ad 10 cm. longa 4 cm. lata acuminata basi late obtusa ; supra olivacea laevia esquamosa ; subtus pallide fulva punctulatim lepidota ; petiolus circ. 1.5 cm. longus lepidotus. Umbellae 4–5-florae terminales ; pedicelli circ. 1.5 cm. longi sigillatim lepidoti. Calyx parvus circ. 2 mm. longus extus lepidotus ; lobi rotundati vel subacuti. Corolla aperte campanulata saturate purpurea et maculata circ. 3.5 cm. longa 5-loba ; tubus intus pilosus extus lepidotus epilosus ; lobi rotundati ; stamina 10 inaequalia inclusa ; filamenta puberula. Gynaeceum staminibus multo longius corollamque superans ; ovarium imbricatim lepidotum epilosum ; stylus ruber glaber. Species Seriei Heliolepidis.

W. Yunnan. Shweli-Salween divide. Forrest. **15,761.** July 1917.

4692 **Rhododendron dichropeplum,** Balf. f. et Forrest.

Frutex ad 4 m. altus. Rami crassi indumento griseo continuo laevi persistente demum nigrescente vestiti. Alabastra ut rami vestita ; perulae extimae longicaudatae. Folia coriacea oblonga nunc ovato-oblonga ad 12 cm. longa 4 cm. lata rostrato-mucronata, basi late obtusa vel subrotundata saepe obliqua ; supra olivacea in juventute albido-floccosa adulta in modum squali corii rugulosa (costa media anguste sulcata) glabra nunc pilorum juvenilium vestigiis induta ; subtus ubique indumento unistrato granuloso haud agglutinato primo griseo postea ferrugineo vestita ; indumenti pili rosulati breviter ramosi (nunc longius) ramis latis vesiculosis haud intertextis ; petiolus ad 2 cm. longus ut rami vestitus. Umbella breviter racemosa ad 10-flora ; pedicelli post anthesin circ. 2.5 cm. longi. Calyx parvus ; lobi 5 carnosuli plus minusve glandulosi et floccoso-fimbriati. Corolla circ. 3.5 cm. longa roseo-maculata intus glabra. Stamina corolla breviora ; filamenta puberula. Discus puberulus. Ovarium glauco-purpureum glabrum ; stylus glaber. Species Seriei Lactei.

N.W. Yunnan. Mts. in N.E. of the Yangtze bend. Forrest. **10,612.** July 1913.

4693 **Rhododendron dolerum,** Balf. f. et Forrest.

Frutex circ. 1 m. altus. Rami primo stipitatim glandulosi sparsimque setuloso-glandulosi floccosi demum verruculosi.

Folia chartacea elongato-ovalia nunc subobovalia ad 6.5 cm. longa (petiolo glanduloso purpureo ad 2.2 cm. longo incluso) 3 cm. lata, apice subrotundata vel obtusa rostratim apiculata, basi late obtusa vel rotundata ; supra atro-olivacea nunc subpurpurascentia glabra ; subtus flavido-olivacea pilis brevibus sebaceis aurantiacis conspersa. Umbella 4–5-flora ; pedicelli stipitatim glandulosi circ. 1.5 cm. longi. Calyx kermesinus ; lobi dense glandulosi majores circ. 3 mm. longi. Corolla rosea glabra varo angusto basali notata ad 3.5 cm. longa. Stamina longiora corollam subaequantia ; filamenta puberula (pilis paucis vesiculosis nunc subnullis). Discus dense puberulus. Gynaeceum corolla sublongius ; ovarium glandulosum (glandulis flavis longe stipitatis) nunc pilis floccosis etiam indutum ; stylus glaber. Species Seriei Selensis.

S.W. Szechwan. Mts. around Mu-li. Forrest. **16,318.** June 1918.

Rhododendron dumosulum, Balf. f. et Forrest.

Frutex ad .5 m. altus parviflorus. Rami pauci crassiusculi lente crescentes ad 3 mm. diam. indumento tenui ferrugineo primo obtecti. Alabastra leviter pubescentia. Folia coriacea ad 8.5 cm. longa 1 cm. lata lanceolata obtusa revoluta basi rotundata ; supra atroviridia glabra (costa media sulcata excepta) in modum squali corii rugulosa ; subtus ferruginea indumento bistrato squarroso cinerascente persistente ex pilis rosulatis constructo vestita ; petiolus circ. 1 cm. longus fulvo-squameus. Umbella breviter racemosa 7-flora ; pedicelli circ. 8 mm. longi pubescentes. Calyx conspicuus dentibus 5 deltoideis 1 mm. longis floccoso-fimbriatis. Corolla oblique infundibuliformis alba roseo-suffusa maculata ad 2 cm. longa intus puberula ; lobi 5 lati emarginati. Stamina 10 inaequalia corolla gynaeceoque breviora ; filamenta puberula subglutinosa. Gynaeceum corolla paullo brevius ; ovarium 3 mm. longum ; stylus glaber ; stigma lobulatum stylo latius. Species *Rh. levistrato*, Balf. f. et Forrest affinis.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,088.** June 1917.

4695 **Rhododendron duseimatum,** Balf. f. et Forrest.

Frutex ad 1.5 m. altus. Rami tenues primo glandulosi et pilis sebaceis sparsim vestiti. Folia tenuiter coriacea oblonga vel anguste ovali-oblonga ad 11 cm. longa (petiolo glabrescente 1.5 cm. incluso) 3 cm. lata utrinque subangustata, apice apiculata, basi late obtusa ; supra atroviridia glabra ; subtus olivaceo-brunnea indumento detersili tenui pilorum rosulatorum breviter ramosorum praedita. Umbella circ. 10-flora ; pedicelli sparsim

floccosi ad 3 cm. longi. Calyx parvus ; lobi late ovati sparsim floccosi ciliati. Corolla pallide rosea emaculata sed varo angusto kermesino notata campanulata ad 4 cm. longa glabra. Stamina corolla multo breviora ; filamenta puberula. Discus sub ovario dense puberulus. Gynaeceum corollam fere aequans ; ovarium dense floccosum (pilis sebaceis) et sparsim glandulosum ; stylus glaber. Species Seriei Selensis indumento rosulato distinguenda.

S.E. Tibet. Doker-la. Mekong-Salween divide. Forrest. **14,464**. July 1917.

4696 **Rhododendron emaculatum,** Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Rami albido-floccosi glabrescentes. Perulae floccosae plus minusve persistentes. Folia coriacea patentia haud deflexa oblanceolata vel anguste oblongo-ovalia ad 12 cm. longa (petiolo incluso) 3.5 cm. lata, rostrato-mucronata, basi obtusa ; supra olivacea in modum squali corii rugulosa glabrescentia vestigiis pilorum juvenilium sparse induta ; subtus sordide grisea (costa media rubro-tincta elevata sparsim floccosa venisque primariis utrinsecus circ. 12 leviter prominulis) indumento laevi scintillante persistente unistrato e pilis rosulatis breviter ramosis haud intertextis aedificato vestita ; petiolus tenuis ad 1.5 cm. longus floccoso-glabrescens. Umbella breviter racemosa circ. 8-flora ; bracteae sericeae ; bracteolae subulatae circ. 6 mm. longae puberulae ; pedicelli ad 2 cm. longi floccosi. Calyx parvus ; lobi carnosuli sparsim floccoso-fimbriati. Corolla saturate rosea emaculata obliqua campanulata tenuis ad 4 cm. longa intus glabra ; lobi lati emarginati. Stamina 10 inaequalia corolla gynaeceoque breviora ; filamenta fere glabra. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium dense floccoso-tomentosum ; stylus glaber. Species *Rh. Beesiano*, Diels arcte affinis.

S.E. Tibet. Tsarong. Doker-la. Forrest. **14,352.** July 1917.

4697 **Rhododendron esetulosum,** Balf. f. et Forrest.

Frutex ad 1.5 cm. altus. Rami crassi glandulosi esetulosi. Folia coriacea oblonga vel ovali-oblonga ad 11 cm. longa 3.5 cm. lata, apice rostrato-apiculata, basi rotundata ; supra atroviridia glabra subrugulosa ; subtus pallide fulva indumento tenui detersili pilorum rosulatorum deliquescentium vestita ; petiolus ad 2.3 cm. longus glabrescens (juventute glandulosus et floccosus). Umbella breviter racemosa ad 10-flora ; pedicelli circ. 2 cm. longi (sub fructu aucti). Calyx foliaceus 5-partitus ; cupula glandulosa ; lobi inaequales erubescentes ad 7 mm. longi ovales glanduloso-ciliati dorso sparsim glandulosi. Corolla infundibuliformi-campanulata ad 4 cm. longa flavido-alba roseo-

suffusa kermesino-maculata glabra 5-loba ; lobi lati. Stamina corolla breviora ; filamenta puberula. Discus minute puberulus. Gynaeceum corolla brevius ; ovarium glandulosum ; stylus ad medium vel ultra glandulosus. Species *Rh. setiferae*, Balf. f. et Forrest in Serie Souliei affinis.

Eastern N.W. Yunnan. Mts. N.E. of Chungtien. Forrest. **16,581.** July 1918.

Rhododendron eucallum, Balf. f. et Forrest.

Frutex virgatus ad 2.5 m. altus. Rami tenues primo glandulosi demum glabri. Folia tenuiter coriacea ovalia ad 11 cm. longa 4.5 cm. lata mucronulato-apiculata, basi subcordulata ; supra atro-olivacea glabra ; subtus pallide olivacea pilis sebaceis brevibus aurantiacis copiose vestita ; petiolus ad 2 cm. longus sparsim glandulosus. Umbella 4–5-flora ; pedicelli tenues divaricati circ. 2 cm. longi glandulosi. Calyx circ. 4 mm. longus 5-partitus ; cupula atro-purpurea glandulosa ; lobi virides oblongi apice rotundati glandulosi. Corolla alba aperta circ. 4 cm. longa glabra emaculata ; lobi 5 late rotundati. Stamina corolla breviora ; filamenta puberula. Discus puberulus. Gynaeceum corolla paullo brevius ; ovarium dense glandulosum ; stylus in triente infimo glandulosus. Species ex affinitate *Rh. cymbomorphi*, Balf. f. et Forrest.

N.W. Yunnan. Bei-ma-Shan. Forrest. **13,938.** June 1917.

Rhododendron euchaites, Balf. f. et Forrest.

Frutex ad 1.5 m. altus. Rami subtenues indumenti cinerei vestigiis plus minusve praediti glabrescentes. Folia petiolata ad 10 cm. longa ; lamina coriacea oblonga vel oblongo-ovalis saepe supra medium paullo latior ad 8.5 cm. longa 2.5 cm. lata, apice rotundata mucrone conspicuo subrostratim apiculata, margine plana, basi late obtusa vel subrotundata ; supra atro-olivacea glabra laevis, costa media anguste sulcata, venis primariis utrinsecus ad 10 occultis ; subtus glauca roseo-suffusa ubique papillis epidermicis ceriferis baculiformibus contiguis notata, venis primariis sepultis, costa media rubra elevata floccis albidis brevibus plus minusve induta ; petiolus ad 1.5 cm. longus atro-purpureus ut rami vestitus. Umbella ad 8-flora ; pedicelli breves circ. 7 mm. longi indumento subfulvo floccoso omnino involuti sub calyce expansi. Calyx ruber ad 1 cm. longus sed variabilis plerumque brevior membranaceus demum declinatus saepe deciduus nunc dimidiatus et irregulariter acuteque lobatus nunc partitus lobis inaequalibus sparsim ciliatis. Corolla tubuloso-campanulata ad 4 cm. longa laete kermesina 5-loba basi 5-gibbosa et variculata glabra ; lobi

rotundati emarginati. Stamina 10 inaequalia corolla gynaeceoque paullo breviora ; filamenta glabra. Discus glaber. Gynaeceum corollam aequans vel ea paullo longius ; ovarium angustum conoideum pilis floccosis subfulvidis lanato-tomentosum ; stylus basi sparsim floccosus. Capsula curvata ad 2.5 cm. longa 4 mm. lata. Species ex affinitate *Rh. neriiflori*, Franch. regionem inter flumina Shweli et Salween incolens.

Western Yunnan. Shweli-Salween divide. Forrest. **12,125.** June 1913.

Rhododendron Faberioides, Balf. f.

Frutex. Rami subcrassi dense tomentosi. Folia petiolata ad 10.5 cm. longa ; lamina oblongo-ovalis vel paullo obovalis breviter rostrata paullo recurva, basi paullo rotundata ; supra atro-viridis laevis minute papulosa opaca, costa media puberula ; subtus brunnea indumento denso e pilis longis ramosissimis intertextis ubique obtecta ; petiolus circ. 8 mm. longus. Umbella circ. 10-flora ; bracteae sericeae ; bracteolae pedicellis breviores ; pedicelli circ. 2 cm. longi dense floccosi et glandulosi. Calyx circ. 1 cm. longus 5-partitus ; cupula ut pedicelli floccoso-glandulosa ; lobi oblongo-ovales vel obovales nunc inaequales submembranacei ochracei 4 mm. lati extus glabri margine floccoso-glandulosi. Corolla infundibuliformi-campanulata circ. 4 cm. longa 5-loba ; lobi breves rotundati emarginati. Stamina 10 gynaeceo multo breviora ; filamenta puberula. Gynaeceum corolla brevius ; ovarium breve dense tomentoso-glandulosum ; stylus glaber. Species ad *Rh. Faberii*, Hemsl. spectans.

Western Szechwan. Wilson. **3436.** June 1908. In Herb. Kew.

Rhododendron fissotectum, Balf. f. et Forrest.

Frutex ad 2 m. altus. Rami breves crassi primo floccosi demum rubro-purpurei glabrescentes. Folia petiolata ad 6 cm. (vel ultra) longa ; lamina coriacea ovalis vel oblongo-ovalis ad 3 cm. lata mucronato-apiculata, margine recurva, basi cordulata vel rotundata ; supra atroviridis opaca primo dense floccoso-tomentosa demum glabra (costa media excepta) ; subtus ubique fulva indumento crasso bistrato venas occludente vestita, strati superi pilis crassis multiramosis superficiem laxam haud agglutinatam demum fissam fingentibus nunc deciduis ; petiolus circ. 8 mm. longus primo supra floccosus demum glabrescens saepe flavus. Umbella circ. 6-flora compacta ; bracteae sericeae ; pedicelli circ. 8 mm. longi glabri. Calyx inconspicuus. Corolla rosea maculata campanulata circ. 3 cm. longa intus puberula 5-loba ; lobi lati breves. Stamina 10 inaequalia corolla multo breviora ; filamenta puberula. Discus

sub ovario minute puberulus. Gynaeceum stamina subaequans ; ovarium glabrum minute papillatum atro-purpureum (in siccitate) ; stylus validus glaber. Capsula vix 2 cm. longa glabra purpurea. Semina oblonga complanata spadicea exarillata. Species in Seriem Taliensem forsan ponenda.

Western N.W. Yunnan. Mts. W. of Atuntzi. Forrest. **14,049.** June 1917.

4702 **Rhododendron fulvastrum,** Balf. f. et Forrest.

Frutex nanus ad .5 m. altus. Rami nodulati juveniles indumento tenui pilorum rosulatorum intertextorum et glandulis paucis longis induti. Perulae fugitivae. Folia petiolata ad 6.5 cm. longa ; lamina oblongo-ovalis saepe curvata obtusa minute mucronulata, margine paullo recurvata, basi obtusa ; supra viridis glabra laevis ; subtus subfulvida indumento tenui e pilis rosulatis longe ramulosis constructo laxe vestita, costa media elevata erubescente, venis primariis ad 10 vix visis ; petiolus circ. 5 mm. longus ut rami vestitus. Umbella ad 4-flora ; pedicelli ad 2 cm. longi sebaceo-floccosi glandulosi. Calyx ad 4 mm. longus extus glaber ; lobi 5 rotundati membranacei flavidi cupulam aequantes brevissime et sparsim floccoso-ciliati. Corolla campanulata pallide flava ad 3.5 cm. longa 5-loba glabra ; lobi rotundati emarginati. Stamina 10 inaequalia, longiora stylum aequantia ; filamenta glabra. Discus glaber. Gynaeceum corolla multo brevius ; ovarium pilis fasciatis dense tomentosum eglandulosum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Kiu-chiang divide. Forrest. **19,023.** July 1919.

4703 **Rhododendron glaphyrum,** Balf. f. et Forrest.

Frutex ad .5 m. altus. Rami tenues plus minusve nodulati indumenti vestigiis floccosis griseis notata et glandulis subsetulosis vestita. Perulae fugitivae. Folia subsessilia circ. 5 cm. longa ; lamina coriacea ovalis, apice rotundata vel late obtusa apiculato-mucronulata, margine fere plana, basi rotundata ; supra atro-olivacea glabra laevis, costa media rubida sulcata, venis primariis utrinsecus ad 10 impressis ; subtus griseo-viridis vel subfulvido-viridis (costa media et venis primariis elevatis rubidis) venularum ultimo reticulo caeruleo-nigro (sub strato papillarum ceriferarum epidermicarum superficiali) notata glabra nunc hic et illic vestigia albida vel rufescentia indumenti detersilis gerens ; petiolus subnullus vel 1–2 mm. longus et ut rami vestitus. Umbella ad 4-flora ; pedicelli ad 2 cm. longi pilis breviter setulosis rufescentibus glutinosis et glandulis setulosis paucis vestiti. Calyx subfoliaceus roseo-

suffusus 6 mm. longus 5-partitus ; lobi inaequales membranacei deinde recurvi glabri (margine glanduloso-ciliato excepto). Corolla roseo-suffusa et -marginata campanulata ad 4 cm. longa ; lobi rotundati emarginati. Stamina 10 inaequalia gynaeceo breviora ; filamenta glabra. Gynaeceum corolla brevius ; ovarium pilis sebaceis fasciatis ascendentibus tomentosum eglandulosum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,936.** July 1919.

Rhododendron glauco-aureum, Balf. f. et Forrest.

Fruticulus parvifolius intricato-ramosus ad 20 dm. altus. Ramuli rufi estrigillosi squamis peltatis carnosulis sessilibus et stipitatis plus minusve induti, vetustiores cinerei verruculosi. Folia per annum persistentia breviter petiolata circ. 1.5 cm. longa ; lamina coriacea ovalis vel elliptica ad 7 mm. lata vel minor, apice rotundata tuberculato-mucronata, margine recurva undulata squamis carnosulis impressis decorata, basi in petiolum attenuata ; supra olivacea demum purpurascens glabra sed squamis vestigialibus distantibus impressis saepe nigris obscure notata, costa media sulcata ; subtus primo papillis epidermicis ceriferis contiguis glauca hic et illic squamis peltatis carnosulis notata demum aurantiaca esquamata, costa media elevata squamis carnosulis conspersa nunc glabrescente ; petiolus ad 2 mm. longus ut rami vestitus. Flos solitarius terminalis nutans ; pedicelli ad 3 cm. longi purpureo-colorati squamis carnosulis conspersi ad verticem expansi et reflexi. Calyx circ. 5 mm. longus 5-partitus ; cupula carnosula atro-sanguinea ; lobi elliptici flavido-virides adpressi glabri margine pilis rectis minutissimis ciliato excepto. Corolla campanulata pallide roseo-purpurea carnosula circ. 1.7 cm. longa intus puberula ad medium 5-lobata ; lobi oblongo-obovati. Stamina 10 subaequalia alternatim paullo longiora circ. 1 cm. longa ; filamenta basi nuda sursum fere ad antheras villosula. Gynaeceum corollam aequans ; ovarium ovoideum circ. 3 mm. longum squamis glandulosis plus minusve stipitatis vestitum ; stylus glaber rectus sub stigmate lobulato expansus. Species ex phylo *Rh. campylogyni,* Franch.

Western Yunnan. Shweli-Salween divide. Forrest. **17,544.** July 1918.

Rhododendron glaucopeplum, Balf. f. et Forrest.

Frutex ad 2.5 m. altus *Rh. Balfouriani,* Diels aspectu sed calyce parvulo longe separatur. Rami robusti glabri. Alabastra pubescentia. Folia coriacea ovalia vel oblongo-ovalia

ad 10 cm. longa 3.5 cm. lata, acuta mucronulata, basi cordulata ; supra glabra (costa media sulcata floccosa excepta) olivacea in modum squali corii rugulosa ; subtus grisea (costa media nunc rubescente elevata) indumenti pellicula bistrata agglutinata tenui scintillante persistente e pilis crasse stipitatis longis multiramosis intricatim intertextis et pilis brevibus rosulatis constructa vestita ; petiolus glabrescens saepe flavidus circ. 1 cm. longus. Umbella racemosa circ. 10-flora rhachi brevi glabra ; bracteolae pedicello multo breviores ; pedicelli glaberrimi circ. 1.5 cm. longi. Calyx parvulus glaber. Corolla obliqua infundibuliformi-campanulata rosea et dense roseo-maculata circ. 3.5 cm. longa intus puberula ; lobi lati rotundati emarginati. Stamina 10 inaequalia corolla fere dimidio breviora ; filamenta pubescentia. Discus minute puberulus. Gynaeceum corolla paullo (5 mm.) brevius ; ovarium conoideum truncatum glabrum minute papillatum ; stylus glaber. Species ex affinitate *Rh. sigillati*, Balf. f. et Forrest.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,133.** July 1917.

4296 **Rhododendron gymnogynum,** Balf. f. et Forrest.

Frutex ad 13 m. altus. Ramuli juveniles crassiusculi pilis floccosis sebaceis rufescentibus plus minusve vestiti glabrescentes. Perulae eglandulosae. Folia petiolata ad 9.5 cm. longa adventu novellorum decidua ; lamina rigida coriacea oblonga vel oblongo-ovalis vel anguste obovalis, apice lata acutiuscula breviter rostrato-mucronulata, margine recurva, basi obtusa ; supra olivacea laevis glabra costa media anguste sulcata, venis primariis utrinsecus ad 24 pinnatim patentibus obscure sulcatis ; subtus grisea ubique papillis epidermicis ceriferis haud omnino contiguis induta, costa media elevata erubescente epapillata floccorum vestigiis (praecipue ad latera) sparsissime praedita, venis primariis sulcatis conspicuis ; petiolus atro-purpureus ad 1.5 cm. longus ut rami vestitus. Umbella racemosa circ. 10-flora rhachi circ. 1.2 cm. longa cum pedicellis brevibus circ. 6 mm. longis rufo-floccosa et setuloso-glandulosa. Calyx parvus carnosulus atro-kermesinus glaber ; lobi 7 deltoidei aurantiaci circ. 1 mm. longi. Corolla carnosula kermesina pauci-maculata oblique campanulata postice ad 3 cm. longa antice vix 2.5 cm. 7-loba basi gibbosa ibique intensius colorata glabra ; lobi rotundati emarginati. Stamina 14 circ. 2.7 cm. longa corolla multo breviora ; filamenta glabra. Discus glaber. Gynaeceum circ. 3.5 cm. longum corollam aequans ; ovarium cylindricum truncatum circ. 5 mm. longum laeve glabrum ; stylus glaber.

Western Yunnan. Shweli-Salween divide. Forrest. **17,495.** May 1918.

4703 **Rhododendron heptamerum,** Balf. f.

Arbor parva ad 6 m. alta. Rami crassi. Ramuli annotini glabri subnitidi. Alabastra oblonga cylindrica; perulae exteriores crustaceae viscidae. Folia ad 14 cm. longa 3.5 cm. lata coriacea oblonga, apice rotundata mucronata, margine undulata plus minusve asperata, basi obtusa vel cuneata; supra opaca olivacea glabra; subtus glauca papillis epidermicis conspicuis dense vestita, costa media prominula, venis primariis plurimis pinnatim patulis; petiolus circ. 2 cm. longus glaber rugosus. Umbella racemosa circ. 14-flora; bracteae intimae rubrae membranaceae oblongo-spathulatae circ. 3 cm. longae utrinque sericeae; bracteolae pedicellis aequilongae pilo-cristatae; pedicelli vix 1 cm. longi plus minusve floccosi glabrescentes. Calyx parvus glaber. Corolla tubuloso-campanulata kermesina postice varo basali praedita emaculata; tubus basi gibbosus; lobi 7 emarginati circ. 1 cm. longi 1.5 cm. lati. Stamina 14 inaequalia gynaeceo breviora; filamenta glabra. Discus glaber. Gynaeceum corolla paullo brevius; ovarium glabrum vel floccis paucis conspersum; stylus glaber stigma parvum discoideum gerens. Species Seriei Irrorati.

N.E. Upper Burma. Above Hpimaw. Farrer. **814.** Forrest. **17,827.** 11th April 1919.

4708 **Rhododendron himertum,** Balt. f. et Forrest.

Frutex parvus. Rami nodulati vestigiis indumenti tenuis floccosi adpressis griseis notati. Perulae fugitivae. Folia petiolata ad 6 cm. longa; lamina coriacea anguste obovalis vel subovalis saepe curvata ad 5.5 cm. longa 2 cm. lata obtusa breviter apiculatim mucronata, margine paullo recurva, deorsum subattenuata, basi obtusa plerumque obliqua; supra olivacea, adulta glabra; subtus albida subtiliter roseo-suffusa (costa media elevata rubescente, venis primariis circ. 8–10 basim versus paullo elevatis et rubescentibus sursum occultis) indumento bistrato albido alveolato obtecta pilis rosulatis strati superi laxi longiramosis plus minusve detersilibus inferi breviramosis; petiolus circ. 5 mm. longus ut rami vestitus. Umbella plerumque 4-flora; pedicelli ad 1.5 cm. longi dense floccoso-tomentosi eglandulosi. Calyx ad 4 cm. longus lanato-tomentosus; lobi semilunati virides circ. 2 cm. longi floccoso-ciliati. Corolla campanulata vix 3 cm. longa lutea 5-loba; lobi rotundati emarginati. Stamina 10 inaequalia corolla et gynaeceo multo breviora; filamenta glabra. Discus glaber. Gynaeceum corolla paullo brevius; ovarium dense floccoso-tomentosum eglandulosum; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Forrest. **16,728.** July 1918.

Rhododendron iodes, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Rami robusti eperulati annotini ad 7 mm. diam. dense ferrugineo-tomentosi tomento bistrato persistente. Perulae extimae crustaceae late ovatae acuminatae vel caudatae carinatae apice recurvae dense ferrugineo-tomentosae ; intermediae latiores tenuiores obovatae vel late ovatae vel subspathulatae circ. 1 cm. longae 7 mm. latae apice rotundatae vel subtruncatae apiculatae extus pilis sebaceis ferrugineis pubescentes, margine ciliatae apiculo omnino tomentoso ; intimae membranaceae flavidae elongato-spathulatae circ. 2.5 cm. longae 4 mm. latae acutae ciliatae et extus plus minusve puberulae ; folia juvenilia involuta utrinque dense tomentosa supra pilis albidis detersilibus. Folia petiolata ad 13 cm. longa ; lamina crasse coriacea lanceolata nunc oblanceolata ad 11 cm. longa 2.5 cm. lata utrinque attenuata, acuta hydathodo tuberculato sessili terminata, margine revoluta, basi longe cuneata ; supra (siccitate) purpurascens nitens glabra (costa media anguste sulcata floccis paucis marcidis conspersa excepta) venis primariis utrinsecus circ. 15 vix conspicuis ; subtus ferruginea omnino (costa media elevata inclusa) indumento bistrato persistente vestita, superficie opaca molli compacta haud agglutinata ; pili strati superi rosulati ramis longis latis secretione ferruginea impletis intricato-intertextis, rosulae strati inferi ramos breves paucos albidos gerentes ; petiolus ad 2 cm. longus supra sulcatus omnino ferrugineo-tomentosus. Umbella racemosa 10–12-flora, rhachi ad 1 cm. longa plus minusve tomentosa ; bracteolae filiformes circ. 8 mm. longae pedicellis breviores ubique pilosae apice pilo-cristatae ; pedicelli rigidi circ. 1.5 cm. longi dense floccosi apice incrassati paullo obliqui. Calyx minutus ; lobi 5 rotundati floccoso-fimbriati. Corolla alba rubro-maculata paullo obliqua infundibuliformi-campanulata circ. 3.5 cm. longa extus intusque glabra 5-loba ; lobi lati circ. 1.5 cm. longi 2 cm. lati subundulati emarginati. Stamina 10 inaequalia corolla multo breviora, longiora circ. 2 cm. longa brevissima 1.2 cm. ; filamenta basi paullo dilatata tenuiter puberula ; antherae oblongae circ. 2 mm. longae. Discus glaber. Gynaeceum circ. 2.5 cm. longum corolla brevius staminibus longius ; ovarium (siccitate) atro-purpureum conoideum truncatum vix sulcatum circ. 5 mm. longum sparsim floccosum ; stylus glaber sub stigmate parvo lobulato vix expansus. Capsula cylindrica recta circ. 1.7 cm. longa 7 mm. lata glabra sulcata plus minusve purpurascens ab apice valvis 5 dehiscens. Semina pallide brunnea oblonga subcomplanata striata circ. 2 mm. longa vix 1 mm. lata ala angusta unilaterali praedita, extremitate chalazali angusta haud arillata, funiculari fimbria parva cincta. Species ad vicinitatem Seriei Taliensis forsan referenda.

S.E. Tibet. Tsarong. On Doker-la. Forrest. **16,745.** July–Aug. 1918.

Rhododendron keleticum, Balf. f. et Forrest.

Frutex parvifolius semiprostratus circ. 1.5 dm. altus multiramosus. Rami tenues (ultimi circ. 1.5 mm. diam.) perulati verruculoso-lepidoti estrigillosi. Folia breviter petiolata ad 2 cm. longa sed plerumque breviora circ. 1 cm. ; lamina coriacea oblongo-ovalis vel ovalis vel oblonga ad 6 mm. lata, apice obtusa vel rotundata prominenter mucronulata, margine recurva pilis remotis albidis tenuibus plus minusve detersilibus ciliata, basi obtusa vel subcuneata ; supra perviridis nitens rugulosa squamis obscuris vestigialiter lepidota, costa media sulcata puberula, venis primariis occultis ; subtus primo grisea deinde brunneo-ferruginea imbricatim lepidota (costa media elevata substraminea squamis paucis conspersa) obscure fulvido-punctulata squamis magnis paucioribus aequaliter distributis ; petiolus circ. 2 mm. longus ut rami vestitus. Flos solitarius terminalis ; pedicelli basi sub anthesi bracteis cincti erecti squamis albidis inaequalibus et pilis simplicibus paucis conspersi sub calyce expansi. Calyx ruber 5-partitus circ. 6 mm. longus ; cupula atro-kermesina carnosula glabra vel squamis paucis maculata ; lobi ovati vel oblongo-ovati acuti vel obtusi extus glabri nunc ad lineam mediam sparsim lepidoti sed haud puberuli margine pilis longis rubro-tinctis ciliati. Corolla purpureo-kermesina maculata aperta vix 2 cm. longa extus pilosa et lepidota intus basi puberula ; lobi ovales plus minusve crenulati. Stamina 10 corolla gynaeceoque breviora ; filamenta purpurea supra basim glabram pilis brevibus villosula. Discus viridis puberulus. Gynaeceum corolla paullo brevius ; ovarium parvum petasiforme vix 2 mm. longum squamis peltatis viridibus imbricatim indutum ; stylus glaber. Species Seriei Saluenensis.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,918.** Aug. 1919.

Rhododendron laxiflorum, Balf. f. et Forrest.

Frutex ad 6 m. altus. Rami tenues virgati late patentes glandulosi demum verruculosi. Folia petiolata tenuiter coriacea lanceolata vel anguste oblongo-ovalia ad 15 cm. longa 4.5 cm. lata utrinque paullo attenuata, apice breviter mucronulato-apiculata, margine cartilaginea subasperata, basi obtusa vel subcuneata saepe inaequalia ; supra pallide viridia opaca laevia glabra sed in sulco costae mediae et caeteroquin pilis marcidis et pedibus glandularum plus minusve notata, venis primariis occultis utrinsecus ad 16 ; subtus pallidiora reti venularum indistincto ubique rubro-punctulata, costa media

elevata ; petiolus circ. 1.5 cm. longus glandulosus. Umbella racemosa laxa ad 12-flora rhachi viridi glabra ad 1 cm. longa ; pedicelli 2–3 cm. longi stricti glandulosi. Calyx minutus ; lobi rotundati glandulosi. Corolla puralba nunc extus roseo-suffusa aperte campanulata ad 4 cm. longa extus intusque glabra 5-loba ; lobi subelliptici emarginati. Stamina 10 inaequalia corolla gynaeceoque breviora ; filamenta basi glandulosa. Discus glaber. Gynaeceum corollam subaequans ; ovarium conoideum dense glandulosum glandulis stipitatis ; stylus ex toto glandulosus. Species Seriei Irrorati.

Western Yunnan. Shweli-Salween divide. Forrest. **17,953.** May 1919.

4711 **Rhododendron mannophorum,** Balf. f. et Forrest.

Frutex ad .5 m. altus erecto-ramosus. Rami tenues glabri sed vestigiis indumenti juvenilis albidis plus minusve induti. Perulae per annum unum plus minusve persistentes. Folia breviter petiolata ad 6.5 cm. longa ; lamina coriacea oblonga vel oblanceolata vix 6 cm. longa ad 1.7 cm. lata utrinque subattenuata, apice obtusa vel acuta, margine paullo recurva, basi obtusa ; supra pallide olivacea glabra laevis, costa media sulcata, venis primariis utrinsecus circ. ad 7 occultis ; subtus albido-grisea (costa media suberubescente elevata, venis primariis indumento indutis nunc elevatis) indumento persistente e pilis crasse stipitatis longiramosis et pilis rosulatis breviramosis constructo superficiem subalveolatam nunc subagglutinatam scintillantem fingente vestita ; petiolus ad 5 mm. longus ut rami vestitus. Umbella ad 6-flora ; pedicelli validi laxe setuloso-glandulosi. Calyx magnus foliaceus inaequaliter 5-partitus flavidus (?) roseotinctus circ. 1 cm. longus ; lobi membranacei ampli subintegri vel lobati late cucullati demum deflexi persistentes dorso ventreque glabri margine sebaceo-ciliati. Corolla campanulata circ. 3.5 cm. longa alba roseo-suffusa et -marginata 5-loba ; lobi rotundati emarginati. Stamina subaequalia 10 corolla et gynaeceo multo breviora ; filamenta villosula pilis tenuibus. Discus glaber. Gynaeceum corollam subaequans ; ovarium 5-sulcatum glandulis breviter stipitatis aurantiacis (nunc pilis fasciatis intermixtis) ad juga dense vestitum ad sulcos nudum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **19,163.** July 1919.

4712 **Rhododendron mesopolium,** Balf. f. et Forrest.

Frutex ad .5 m. altus. Rami nodulati, annotini glabrescentes vestigiis indumenti juvenilis albidis notati et pediculis

siccis glandularum facie setuliformibus sparsissime conspersi. Perulae fugitivae. Folia petiolata ad 6.5 cm. longa ; lamina oblonga vel angustissime obovata ad 6 cm. longa 2 cm. lata, apice rotundata vel late obtusa apiculato-mucronata, margine vix recurva, basi obtusa saepe inaequalis ; supra olivacea glabra opaca, costa media venisque primariis utrinsecus circ. 11 sulcatis ; subtus brunneo-grisea quasi punctulata indumento tenui arachnoideo praedita, venis primariis erubescentibus ; petiolus circ. 5 mm. longus ut rami indutus. Umbella 2–4-flora ; pedicelli vix 1.5 cm. longi floccosi glandulosi glandulis longe stipitatis. Calyx ad 4 mm. longus ; lobi ovales obtusi flavido-virides submembranacei recurvi glabri (margine breviter sebaceo-ciliato excepto). Corolla pallide rosea campanulata circ. 3 cm. longa glabra ; lobi rotundati emarginati. Stamina 10 inaequalia corolla paullo breviora gynaeceum subaequantia ; filamenta puberula. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium pilis ascendentibus longis ramosis dense obtectum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Doker-la. Forrest. **16,751.** July–Aug. 1918.

4713 **Rhododendron metrium,** Balf. f. et Forrest.

Frutex ad 1.5 m. altus. Rami tenues primo glandulosi et pilis sebaceis dense vestiti. Folia tenuiter coriacea ovalia ad 8 cm. longa (petiolo ad 1.5 cm. longo glanduloso et floccoso incluso) apice rotundata apiculata, basi lata obtusa vel subrotundata ; supra atro-olivacea glabra ; subtus olivacea pilis sebaceis aurantiacis et glandularum vestigiis conspersa. Umbella circ. 5-flora ; pedicelli glandulosi circ. 1.2 cm. longi. Calyx parvus ; lobi breves atro-kermesini carnosuli rotundati dense glandulosi. Corolla alba emaculata glabra infundibuliformi-campanulata ad 3.5 cm. longa. Stamina corolla breviora ; filamenta glabra. Discus glaber. Gynaeceum corollam subaequans ; ovarium sparsim glandulosum et floccosum ; stylus glaber. Species Seriei Selensis.

S.E. Tibet. Doker-la. Forrest. **16,679.** July 1918.

4714 **Rhododendron myiagrum,** Balf. f. et Forrest.

Species parva vix 1.5 m. alta. Folia orbicularia basi late rotundata subcordulata ; subtus purpurascenti-glauca rubro-punctulata ; petiolus ad 2 cm. longus verruculosus nunc glandulis marcidis paucis conspersus. Umbella 4–5-flora ; pedicelli ad 2 cm. longi esetulosi dense glanduliferi glandulis brevi-stipitatis. Calycis lobi ubique glandulosi. Corolla alba intus glabra. Staminum filamenta glabra. Species *Rh. jucundo*, Balf. f. et W. W. Sm. e Serie Selensi similis.

Western Yunnan. N'Maikha-Salween divide. Forrest. **17,993.** June 1919.

4915 **Rhododendron nanothamnum,** Balf. f. et Forrest.

Frutex vix 1 m. altus. Rami stricti tenues primo sebaceo-floccosi mox (annotini) glabri. Folia chartacea oblongo-ovalia nunc angusto-obovalia ad 7.5 cm. longa (petiolo atro-kermesino ruguloso vestigialiter floccoso ad 1.5 cm. longo incluso) 3 cm. lata, apice obtusa mucronato-apiculata, basi obtusa vel leviter rotundata nec cordulata; supra purpurea nitida glaberrima; subtus purpureo-glauca pilis caulifloris aurantiacis inter papillas ceriferas conspersa. Umbella 6–8-flora; pedicelli vix 2 cm. longi glandulis brevibus et floccis vestiti. Calyx brevis 5-dentatus dense glandulosus. Corolla aperte campanulata circ. 3 cm. longa flavido-alba extus leviter pallide roseo-suffusa et intus varo parvo kermesino notata. Stamina corolla multo breviora; filamenta puberula. Discus minute puberulus. Gynaeceum corolla paullo brevius; ovarium ad juga glandulosum; stylus glaber. In Seriem Selensem ponenda.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **19,019.** July 1919.

4716 **Rhododendron nebrites,** Balf. f. et Forrest.

Frutex ad 1 m. altus. Rami tenues eglandulosi vestigiis indumenti floccosi albidis plus minusve notati. Perulae per annum unum persistentes. Folia petiolata ad 6 cm. longa; lamina elongato-obovalis deorsum subattenuata, apice rotundata vel late obtusa nunc retusa mucronata, margine exigue recurva, basi obtusa; supra perviridis glabra laevis costa media angusta sulcata venisque primariis utrinsecus circ. 8 vix conspicuis; subtus subcervina (costa media et venis primariis elevatis flavido-griseis) indumento bistrato e pilis crasse stipitatis longe ramosis intricatim intertextis et pilis rosulatis brevi-ramosis constructo superficiem opacam sublanatam subalveolarem fingente vestita; petiolus brevis ad 5 mm. longus nunc subnullus ut rami vestitus. Umbella ad 6-flora; pedicelli ad 3 cm. longi sebacei-floccosi eglandulosi. Calyx parvus circ. 1.5 mm. longus carnosulus; cupula undulatim 5-loba; lobi semilunati vel late ovati margine floccoso-ciliati dorso puberuli. Corolla campanulata pallide citrina ad 3.5 cm. longa 5-loba; lobi rotundati emarginati. Stamina 10 inaequalia longiora stylum aequantia; filamenta sparsim glanduloso-puberula. Discus glaber. Gynaeceum corolla paullo brevius; ovarium pilis longis fasciatis glutinosis vestitum eglandulosum; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **19,153.** July 1919.

Rhododendron oreinum, Balf. f.

Frutex nanus copiose ramosus. Ramuli hornotini breves ascendentes subintricati. Ramuli annotini circ. 1 mm. diam. indumento congesto squamarum peltatarum plus minusve rufo-scintillante induti, seniores nigricantes tandem grisei et decorticantes. Alabastra foliaria ovoidea ; perulae paucae exteriores ochraceo-fulvae ellipticae vel late ovatae obtusae carinatae dorso lepidotae ciliatae, interiores spathulatae membranaceae 3 mm. longae 1.5 mm. latae dorso lepidotae et puberulae apice rotundatae longe ciliatae. Folia petiolata ad 1 cm. longa ; lamina crasse coriacea oblongo-ovalis vel ovata vel subelliptica rarissime subovata ad 8 mm. longa (saepe minor) ad 3.5 mm. lata, apice obtusa nunc rotundata haud mucronulata, margine paullo recurvata, basi obtusa vel late obtusa nec cuneata ; supra atroviridis opaca omnino confertim lepidota, squamis plus minusve arescentibus contiguis ex umbone lato secretione citrina impleto plus minusve scintillante et instita aequilata integra membranacea alba constructis, costa media vix sulcata ; subtus pallidior flavescenti-cinerea brunneo-punctulata, indumento bicolorato densissime lepidoto e squamis contiguis plurimis flavescentibus aureo-annulatis et paucioribus majoribus conspersis secretione rufa scintillante plenis composito ; petiolus 1–2 mm. longus ut rami lepidotus. Flores fere sessiles per paria (nunc singulatim) ad apicem ramulorum orientes ; bracteae sub anthesi plus minusve persistentes, intimae membranaceae oblongae vel obovatae dorso apicem versus lepidotae apice lanato-ciliatae. Calyx ad 2 mm. longus 5-partitus ; cupula extus dense lepidota ; lobi inaequales ochraceo-fulvi vel pallide rosei dorso puberuli nec (nisi rarissime) lepidoti ciliati, lobo maximo oblongo obtuso circ. 1.5 mm. longo lobum minimum rotundatum dimidio superante. Corolla rosea circ. 1 cm. longa extus epilosa elepidota ; tubus campanulatus circ. 2.5 mm. longus fauce minute puberulus in limbum apertum 5-lobatum ampliatus ; lobi circ. 6 mm. longi ovales crenulati inaequilati (latissimo circ. 5 mm. lato angustioribus circ. 3.5 mm.). Stamina 10 alternatim longiora et breviora, longiora circ. 8 mm. longa corolla breviora ; filamenta deorsum paullo dilatata supra basim nudam (circ. 1 mm.) villosa pilis faucem corollae implentibus ; antherae roseotinctae. Discus sub ovario puberulus. Gynaeceum circ. 6 mm. longum staminibus longioribus paullo brevius ; ovarium ovoideum truncatum paullo sulcatum squamis peltatis flavido-viridibus dense lepidotum ; stylus purpureus strictus erectus basi pilosus apice sub stigmate discoideo lobulato haud dilatatus ; stigma labio stylari cinctum. Species Seriei Lapponici *Rh. alpicolae*, Rehd. et Wils. affinis.

W. Szechwan. Yaragong. Soulié. **3701.** May 1904. In Herb. Paris.

4717 **Rhododendron oresterum,** Balf. f. et Forrest.

Frutex ad 2 m. altus. Folia elliptica vel suborbicularia (lamina ad 5.5 cm. longa, 4.5 cm. lata plerumque minore et petiolo sparsim glanduloso ad 2.5 cm. longo) breviter mucronato-apiculata, basi rotundata subcordulata; utrinque glabra; subtus subfulvida. Umbella pauciflora (circ. 5-); pedicelli circ. 2.5 cm. longi sparsim glandulosi. Calyx ad 6 cm. longus 5-partitus; cupula sparsim glandulosa; lobi glanduloso-ciliati dorso plerumque glabri. Corolla aperta flava ad 3 cm. longa. Staminum filamenta glabra. Discus minutus puberulus. Gynaeceum corolla brevius; ovarium glandulosum; stylus ex toto glandulosus. Species ex phylo *Rh. Wardii*, W. W. Sm. quam typus multo minor.

S.E. Tibet. Tsarong. On Ka-gwr-pw. Forrest. **16,715.** July 1918.

4718 **Rhododendron pennivenium,** Balt. f. et Forrest.

Frutex ad 3.5 m. altus subvirgatus. Rami stricti subcrassi glandulosi et indumento tenui mycelioideo vestiti. Folia petiolata ad 16 cm. longa 4 cm. lata lanceolata saepe leviter curvata utrinque attenuata, apice minute mucronulata, margine tenuiter cartilaginea, basi subobtusa vel late cuneata; supra griseo-viridia opaca alveolo-reticulata vestigiis floccorum juvenilium in sulco costae mediae et venarum primariarum adspersa; subtus fulvido-grisea nitentia indumento diaphano persistente pilorum longe ramosorum membranum subarachnoideum fingentium ubique vestita, costa media elevata crassa rubro-glandulosa et floccosa percursa, venisque primariis etiam prominulis utrinsecus ad 22 regulariter patulim divergentibus traversa, venis ultimis prominulis in reticulum alveolatum conjunctis; petiolus plerumque purpureus ad 2.5 cm. longus rubro-glandulosus et floccosus; (folia juvenilia plus minusve rubro-purpurea supra floccosa). Umbella racemosa circ. 8-flora rhachi lanata; pedicelli ad 1.2 cm. longi crassi stipitato-glandulosi et floccosi. Calyx parvus 5-lobus; lobi glandulosi et floccosi. Corolla saturate roseo-purpurea circ. 4.5 cm. longa tubuloso-campanulata carnosula; lobi 5 lati emarginati. Stamina 10 inaequalia corolla breviora; filamenta minute puberula. Gynaeceum corolla longius; ovarium cylindrico-ovoideum truncatum glandulosum et dense floccosum; stylus validus glaber. Species forsan ex affinitate *Rh. argyrophylli*, Franch.

Western Yunnan. Shweli-Salween divide. Forrest. **15,745.** June 1917.

4719 **Rhododendron peramoenum,** Balf. f. et Forrest.

Frutex usque ad 1 m. altus. Rami juveniles albido-floccoso-tomentosi et glandulosi demum fulvidi plus minusve glabrescentes. Folia petiolata ad 16 cm. longa; lamina coriacea lineari-lanceolata ad 14.5 cm. longa 2.5 cm. lata utrinque attenuata longe acuminata margine vix recurvata basi cuneata; supra laete viridis laevis cum costa media sulcata glandulis rubris stipitatis et floccis sparsissime praedita, venis primariis utrinsecus circ. 20 paullo sulcatis; subtus roseo-cervina nunc subgrisea, costa media et venis primariis elevatis, ubique indumento compacto opaco persistente superficialiter plus minusve agglutinato e pilis et glandulis constructo vestita, pilis indumenti dendriformibus rhachi in ramulos delicatos copiose ramosissimos demum adpressos et pelliculam fingentes deliquescente, glandulis rubris; petiolus ad 1.5 cm. longus ut rami vestitus. Umbella racemosa ad 16-flora rhachi tomentosa et glandulosa; pedicelli circ. 7 mm. longi dense tomentosi. Calyx parvus 5-dentatus dentibus circ. 1 mm. longis tomentosis. Corolla campanulata 5-loba ampla circ. 5 cm. longa roseo-kermesina multimaculata basi gibbosa ibique intensius colorata utrinque glabra; lobi rotundati cum tubo maculati. Stamina 10 tubum corollinum aequantia; filamenta glabra. Discus puberulus. Gynaeceum corollam aequans; ovarium elongatum circ. 7 mm. longum pilis floccosis curvatis rufescentibus vestitum; stylus glaber. Capsula circ. 2 cm. longa 7 mm. diam. paullo curvata. Semina pallida circ. 1 mm. longa complanata oblonga alata utrinque cristata. Species Seriei Arborei *Rh. Delavayi*, Franch. affinis.

Western Yunnan. Shweli-Salween divide. Forrest. **17,708.** June 1918.

4720 **Rhododendron poliopeplum,** Balf. f. et Forrest.

Frutex ad .5 m. altus. Rami nodulati vestigiis glandularum paucarum et indumenti albidi notati. Perulae fugitivae. Folia petiolata ad 7.5 cm. longa; lamina coriacea oblongo-obovalis plerumque curvata circ. 6.5 cm. longa 2.5 cm. lata, apice rotundata vel obtusa mucronulata, margine paullo recurva, deorsum attenuata basi cuneata plerumque inaequalis; supra olivacea laevis glabra sed costa media sulcata vestigiatim puberula, venis primariis utrinsecus circ. 10 paullo sulcatis; subtus grisea costa media et venis primariis elevatis subtiliter erubescentibus glabris vel glabrescentibus caeteroquin indumento crustaceo persistente e pilis rosulatis agglutinatis constructo vestita; petiolus rubidus vix 1 cm. longus ut rami indutus. Umbella breviter racemosa ad 7-flora rhachi circ. 5 mm. longa dense ferrugineo-floccosa; bracteae fertiles sericeae ad 2 cm. longae

obovatae ; bracteolae filiformes pedicellis multo breviores ; pedicelli ad 3 cm. longi breviter floccosi eglandulosi. Calyx ad 4 mm. longus extus breviter pulverulento-floccosus ; lobi subvirides persistentes lunati vel rotundati cupulam subaequantes dorso breviter puberuli margine breviter sebaceo-ciliati. Corolla ad 4 cm. longa campanulata pallide lutea opaca 5-loba ; lobi rotundati emarginati. Stamina 10 inaequalia corolla et gynaeceo breviora ; filamenta glabra. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium dense floccoso-tomentosum eglandulosum ; stylus glaber. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **19,175.** July 1919.

3940 **Rhododendron porrosquameum,** Balf. f. et Forrest.

Frutex aromaticus ad 5 m. altus. Rami epilosi squamis albidis sigilliformibus remotis lepidoti. Folia petiolata ad 10 cm. longa ; lamina tenuiter coriacea lanceolata saepe curvata ad 9 cm. longa 3 cm. lata, acuminata longe mucronata, margine plana late cartilaginea, basi obtusa ; supra atroviridis inconspicue sigillatim lepidota costa media sulcata puberula, venis primariis inconspicuis ; subtus pallide viridis squamis membranaceis planis albidis nigro-umbonatis inter se diametro suo proprio vel ultra remotis lepidota, costa media erubescente elevata glabra ; petiolus circ. 1 cm. longus ut rami vestitus. Umbella breviter racemosa 4–6-flora, rhachi puberula et lepidota ; pedicelli stricti ad 1.5 cm. longi albido-lepidoti. Calyx cupularis ad 5 cm. longus inaequaliter 5-lobus ; cupula albido-lepidota ; lobi colorati rotundati inaequales ad 3 mm. longi obtusi vel dente terminali praediti ad lineam mediam dorsi lepidoti, margine erosi et ciliati, nunc decidui. Corolla infundibuliformi-campanulata ad 3 cm. longa postice maculata extus lepidota epilosa intus puberula. Stamina 10 inaequalia corolla breviora ; filamenta supra basim nudam pubescentia. Discus dense puberulus. Gynaeceum staminibus longioribus brevius ; ovarium ovoideum imbricatim lepidotum superne pilo-cristatum ; stylus basi puberulus. Species Seriei Heliolepidis.

Yunnan. Lichiang Range. Western flank. Forrest. **15,071.** June 1917.

4721 **Rhododendron prasinocalyx,** Balf. f. et Forrest.

Frutex ad 4.5 m. altus. Rami glandulosi. Folia tenuiter coriacea oblonga ad 11 cm. longa 4 cm. lata mucronata, basi truncata nunc obtusa vel subcordulata ; supra olivacea nunc purpurascentia glabra ; subtus glauca papillis ceriferis dense vestita rubro-punctulata : petiolus ad 2 cm. longus glandulis paucis praeditus. Umbella circ. 6-flora ; pedicelli ad 2.5 cm.

longi nunc 5 cm. glandulosi. Calycis cupula atrokermesina circ. 1.5 mm. longa ; lobi foliacei ad 5 mm. longi glaucovirides extus margineque glandulosi. Corolla aperta pateriformis sulfurea extus intusque glabra ; lobi orbiculares. Stamina corolla dimidio breviora ; filamenta glabra. Gynaeceum corolla quadrante brevius ; ovarium stipitato-glandulosum ; stylus ex toto glandulosus. Species *Rh. croceo,* Balf. f. et W. W. Sm. valde affinis.

Eastern N.W. Yunnan. Mts. N.E. of Chungtien. Forrest. **16,511.** July 1918.

4703 **Rhododendron prophantum,** Balf. f. et Forrest.

Arbor grandifolia. Rami crassi annotini circ. 1.3 cm. diam. indumento pilorum rigidorum et glandularum longe stipitatarum laxo detersili vestiti. Folia longe petiolata ad 30 cm. longa ; lamina coriacea oblongo-ovalis ad 25 cm. longa 10 cm. lata, apice rotundata, margine prominente cartilaginea plana, basi rotundata ; supra laete viridis laevis pilis rufis et glandulis rubris vestigialibus conspersa, costa media sulcata sulco pilis glandulisque impleto, venis primariis utrinsecus circ. 20 paullo elevatis ; subtus pallidior indumento tenui ferrugineo detersili induta pilis indumenti floccosis axem centralem ramos breves firmos acutos haud intertextos gerentem exhibentibus, costa media crassa cum venis primariis elevatis ferruginea ; petiolus ad 5 cm. longus ut rami vestitus glabrescens. Inflorescentia racemosa ad 15-flora rhachi circ. 4 cm. longa floccosa et glandulosa ; pedicelli ad 2.5 cm. longi dense floccoso-tomentosi et glandulosi. Calyx circ. 5 mm. longus 5-partitus ; lobi rotundato-ovati dense floccosi et glandulosi. Corolla tubuloso-campanulata saturate kermesina carnosula circ. 4.5 cm. longa gynaeceo paullo longior basi gibbosa et intensius colorata extus breviter puberula 5-loba. Stamina corolla paullo breviora ; filamenta puberula. Discus sparsim puberulus. Gynaeceum staminibus paullo longius ; ovarium dense floccosum ; stylus ex toto floccosus. Species Seriei Irrorati ex affinitate *Rh. faceti,* Balf. f. et Ward.

N.E. Upper Burma. N'Maikha-Salween divide. Forrest. **17,928.** June 1919.

4723 **Rhododendron schistocalyx,** Balf. f. et Forrest.

Frutex ad 4 m. altus late et tenuiter ramosus. Rami albofloccosi glabrescentes eglandulosi. Folia petiolata ad 20 cm. longa 4.5 cm. lata coriacea oblanceolata, apice obtusa breviter mucronata, margine cartilaginea plana, basi obtusa ; supra opaca (in sicco), alveolo-reticulata (costa media anguste sulcata), glabrescentia vestigiis floccorum juvenilium sparsim conspersa ; subtus brunneo-olivacea (costa media elevata leviter purpureo-

tincta) opaca glabrescentia vestigiis floccorum ad basim et circum costam mediam conspicuis ; petiolus purpurascens ad 2.5 cm. longus plus minusve floccosus sed glabrescens. Umbella breviter racemosa ad 10-flora rhachi floccosa ; pedicelli circ. 1.5 cm. longi dense floccosi eglandulosi. Calyx ampliatus foliaceus membranaceus roseus poculiformis fere ad basim dimidiatus ad 2 cm. longus inaequaliter lobulatus, ex basi pilis brevissimis forsanque floccis sparsis conspersa caeteroquin glabra. Corolla tubulari-campanulata circ. 4–5 cm. longa laete roseo-coccinea extus glabra, intus basi septis interpetalinis incompletis divisa et varis petalinis notata ; lobi 5 lati emarginati. Stamina 10 inaequalia corolla gynaeceoque breviora ; filamenta puberula. Discus puberulus. Gynaeceum corolla paullo brevius ; ovarium conoideum truncatum pilis floccosis dense vestitum ; stylus ad medium pilis fasciatis floccosus. Capsula paullo curvata brunneo-floccosa circ. 1.5 cm. longa. Species Seriei **Irrorati.**

Western Yunnan. Shweli-Salween divide. Forrest. **17,637.** July 1918.

Rhododendron semnum, Balf. f. et Forrest.

Frutex robustus ad 6 m. altus. Rami annotini glabri sine vestigiis indumenti rufi juvenilis. Folia ad 45 cm. longa epetiolata crasse coriacea oblanceolata vel oblongo-cuneata ab apice rotundato vel subtruncato deorsum attenuata ad 13 cm. lata basi saepe 2 cm. lata ; supra opaca subrugulosa glabra, costa media ad basim pulvinatim elevata puberula excepta, venis primariis plerumque patulis ; subtus fulva laevis sub-nitens indumento bistrato persistente agglutinato vestita, costa media venisque primariis prominentibus glabrescentibus. Umbella racemosa 20-flora, rhachi circ. 2 cm. longa rufo-tomentosa ; bracteae fertiles oblongo-spathulatae circ. 3.5 cm. longae extus intusque minute molliterque sericeae ; bracteolae circ. 5 mm. longae lineari-ligulatae breviter pilosae ; pedicelli ad 4.5 cm. longi indumento tenui arachnoideo plus minusve induti glabrescentes. Calyx minutus deltoideo-dentatus. Corolla obliqua campanulata flavido-alba varo basali rubro notata nunc pauci-maculata circ. 5 cm. longa glabra 8-lobata ; lobi breves lati emarginati. Stamina 16 inaequalia corolla gynaeceoque multo breviora ; filamenta glabra. Discus glaber. Gynaeceum corolla paullo brevius ; ovarium oblongo-ovoideum truncatum curvatum 12-loculare indumento pallide roseo sublanato pilorum fasciatorum praeditum ; stylus glaber. Capsula oblonga circ. 3.5 cm. longa plus minusve aurantiaco-tomentosa. Semina brunnea oblonga complanata anguste arillata, membrana chalazali lata et instita funiculari brevi. Species Seriei Grandis.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,233.** June 1917.

Rhododendron sinonuttallii, Balf. f. et Forrest.

Frutex ad 2.5 m. altus megaphyllus *Rh. Nuttallii,* Booth simillimus sed pedicello pubescente et calyce extus pubescente lepidotoque facile distinguendus.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,939.** Sept.-Oct. 1919.

Rhododendron sphaeroblastum, Balf. f. et Forrest.

Frutex vix 2 m. altus. Rami juveniles crassi circ. 7 mm. diam. glabri nitidi virides vel purpurascentes. Folia magna petiolata ad 15 cm. longa ; lamina crasse coriacea ovalis vel oblongo-ovalis apice obtusa vel subrotundata mucrone parvo rubro sessili terminata margine plana basi rotundata ; supra olivacea in modum squali corii rugulosa glabra costa media sulcata minute puberula excepta, venis primariis utrinsecus ad 12 paullo sulcatis ; subtus laete ferrugineo-tomentosa indumento crasso bistrato persistente vestita, strati superi pilis elongatis sub-dendriformibus multo ramosis superficiem laxam lanatam demum nunc sub-agglutinatam fingentibus et pilos rosulatos breviter ramosos strati inferi superantibus, costa media prominula saepe plus minusve glabrescente ; petiolus ad 2 cm. longus saepe deflexus rugulosus viridis vel purpureus glaber. Umbella racemosa ad 12-flora rhachi valida glabra circ. 1 cm. longa ; inflorescentiae alabaster magnus globosus 3.4 cm. diam. ; bracteae extimae ovatae, interiores obovatae, molles plus minusve puberulae ; pedicelli breves glabri. Calyx parvus 5-lobus glaber ; lobi late triangulares vel ovati obtusi vel subacuti. Corolla (immatura et marcida solum visa) forsan alba roseo-suffusa certe postice kermesino-maculata 5-loba. Stamina 10 inaequalia ; filamenta lata puberula. Discus glaber. Ovarium truncatum glabrum minute papillatum ; stylus staminibus longior glaber. Capsula ad 9-locularis paullo curvata circ. 2 cm. longa 6 mm. diam. valvis simplicibus vel compositis ab apice dehiscens.

S.W. Szechwan. Mts. around Mu-li. Forrest. **17,360.** July 1918. Also **16,377, 17,110.**

Rhododendron stenoplastum, Balf. f. et Forrest.

Frutex ad 3 m. altus. Ramuli epilosi lepidoti. Folia subcoriacea petiolata lanceolata vel oblanceolata acuminata ad 10 cm. longa 2.5 cm. lata, basi saepe inaequalia cuneata ; supra laete viridia laevia squamarum vestigiis obtecta epilosa ; subtus pallide fulva punctulatim lepidota ; petiolus 1.5 cm. longus

lepidotus. Umbella 6-flora terminalis; pedicelli circ. 1 cm. longi sigillatim lepidoti. Calyx parvus circ. 1.5 cm. longus extus lepidotus; lobi rotundati vel subacuti. Corolla aperte campanulata rosea et maculata 5-loba circ. 3 cm. longa intus ad tubum puberula extus lepidota epilosa; lobi rotundati. Stamina 10 inaequalia inclusa; filamenta puberula. Gynaeceum staminibus longius corollam subaequans; ovarium imbricatim lepidotum epilosum; stylus glaber. Species Seriei Heliolepidis.

W. Yunnan. Shweli-Salween divide. Yang-tzow-shan. Forrest. **17,920.** May 1919.

4776 **Rhododendron telopeum,** Balf. f. et Forrest.

Frutex ad 1 m. altus. Rami tenues in juventute purpurei et glandulis brevibus sparsim induti. Folia petiolata ad 5 cm. longa 3 cm. lata coriacea elliptica vel suborbicularia mucronata basi rotundata; supra laete viridia glabra; subtus subglauca papillis ceriferis dense vestita et pilis caulifloris conspersa; petiolus circ. 1.5 cm. longus glandularum vestigiis indutus. Umbella laxa ad 4-flora rhachi glandulosa; pedicelli ad 2.5 cm. longi glandulosi. Calyx parvus glandulosus. Corolla laete flava aperte campanulata circ. 3.5–4 cm. longa intus extusque glabra postice varo basali leviter notata; lobi lati emarginati. Stamina corolla breviora; filamenta glabra. Discus glaber. Gynaeceum corollam aequans; ovarium ad juga glandulosum; stylus glaber. Species Seriei Selensis.

S.E. Tibet. Tsarong. Salween—Kiu-chiang divide. Forrest. **18,963.** July 1919.

4777 **Rhododendron theiophyllum,** Balf. f. et Forrest.

Frutex ad 4 m. altus. Rami crassi tomentosi in juventute intense sulphurei. Alabastra tomentosa. Folia coriacea petiolata oblongo-ovalia ad 12 cm. longa 4 cm. lata rostrato-acuta basi obtusa vel subrotundata inaequalia; supra glabra (costa media excepta); subtus primo intense sulfurea deinde tulva indumento bistrato subscintillante haud agglutinato laevi persistente vestita, indumenti pilis omnibus rosulatis strati superi stipitatis coloratis et ramos longiores paullo intertextos producentibus; petiolus ad 1.1 cm. longus ut rami indutus. Umbella racemosa circ. 10-flora rhachi circ. 1.5 cm. longa; pedicelli inaequales 1–2 cm. longi puberuli. Calyx minutissimus; lobi puberuli. Corolla obliqua maculata circ. 3.5 cm. longa; lobi 5 lati. Stamina 10 inaequalia gynaeceo breviora. Gynaeceum corolla brevius; ovarium sparsim floccosum; stylus glaber. Capsula paullo obliqua glabra. Semina fusiformia alata. Species Seriem Lacteum juxta ponenda.

S.W. Szechwan. Mu-li Mts. Forrest. **16,836.** Aug. 1918.

4728 **Rhododendron trichophlebium,** Balf. f. et Forrest.

Frutex parvifolius. Rami subcontorti primo sparsim rufo-setulosi (setulis glandulosis) demum cinerei glabrescentes. Folia brevissime petiolata vel subsessilia ad 3 cm. longa ; lamina crasse coriacea oblongo-ovalis utrinque paullo attenuata ad 3 cm. longa 1.3 cm. lata acutiuscula mucrone prominulo, margine recurva, basi obtusa ; supra laete viridis laevis glabra, costa media et venis primariis utrinque 6–8 paullo sulcatis ; subtus pallidior flavido-viridis in modum squali corii rugulosa pilis floccosis adpressis albidis ubique sparsim induta sed ad venas primarias prominulas pilis similibus dense induta itaque lineas pilosas conspicuas praebens, costa media prominula straminea sparsim floccosa ; petiolus vix 1.5 mm. longus ut rami vestitus. Umbella parva ad 4-flora ; pedicelli ad 1 cm. longi plus minusve setulosi setulis nunc glandulosis. Calyx parva carnosula ; lobi 5 rotundati vel late dentiformes plus minusve glandulosi. Corolla campanulata atro-kermesina vix 2.5 cm. longa 5-loba basi gibbosa ibique 5-varosa glabra ; lobi rotundati paullo emarginati. Stamina 10 corolla gynaeceoque multo breviora ; filamenta glabra. Discus glaber. Gynaeceum corollam aequans ; ovarium petasiforme truncatum circ. 2 mm. longum rubro-glandulosum glandulis longe stipitatis ; stylus glaber. Capsula recta circ. 1.3 cm. longa extus rugulosa.

S.E. Tibet. Tsarong. Forrest. **18,632.** 1917.

4729 **Rhododendron triplonaevium,** Balf. f. et Forrest.

Frutex ad 3 m. altus. Rami crassi juveniles rufo-tomentosi eglandulosi. Folia breviter petiolata ad 12.5 cm. longa ; lamina crasse coriacea rigida lanceolata vel oblanceolata ad 11.5 cm. longa 3.5 cm. lata breviter acuminata vel obtusa et rostrata mucronata, margine recurvata, basi anguste rotundata vel subauriculata ; supra opaca olivacea glabra costa media sulcata vestigialiter puberula excepta, venis primariis utrinsecus ad 20 ; subtus (costa media prominula) ubique tomento ferrugineo bistrato vestita pilis strati superi rosulatis pauci-ramosis detersilibus strati inferi rosulatis breviter ramosis pallidioribus ; petiolus ad 1 cm. longus saepe erubescens ut rami vestitus. Umbella breviter racemosa circ. 12-flora rhachi pubescente ; bracteae sub anthesi persistentes ; bracteolae aristiformes ; pedicelli circ. 1–2 cm. longi pubescentes eglandulosi. Calyx minutus carnosulus vix 1 mm. longus 5-lobus glaber ; lobi brevissime ciliati. Corolla flavido-alba varo postico basali kermesino triradiato notata campanulata circ. 3.2 cm. longa 5-gibbosa extus glabra intus puberula 5-loba ; lobi rotundati emarginati crenulati. Stamina 10 inaequalia corolla breviora ;

filamenta puberula. Discus puberulus. Gynaeceum circ. 2.3 cm. longum staminibus longius; ovarium ferrugineo-tomentosum; stylus glaber. Capsula paullo curvata circ. 2 cm. longa 6 mm. diam. Semina oblonga pallide brunnea anguste alata. Species ad vicinitatem Seriei Taliensis referenda.

Western N.W. Yunnan. Tseku. Soulié. **1029** bis. In Herb. Paris; Mekong-Salween divide. Forrest. **13,570.** Oct. 1914.

4730 **Rhododendron tritifolium,** Balf. f. et Forrest.

Frutex ad 3 m. altus. Rami crassi tomento compacto bistrato dense obtecti. Folia lanceolata ad 15 cm. longa; lamina ad 3.4 cm. lata, apice angustata breviter subrostrata, deorsum attenuata in petiolum anguste alatum continuata; supra glabrescens; subtus cinnamomea indumento bistrato dein detersili obtecta strati superi pilis rosulatis longe ramosis, inferi pilis rosulatis breviter ramosis; petiolus circ. 2.5 cm. longus pubescens glandulosus. Umbella racemosa 15-flora; bracteae dense pubescentes; bracteolae breves vix 4 mm. longae; pedicelli floccoso-glandulosi. Calyx parvus puberulus. Corolla circ. 4 cm. longa 5-loba alba roseo-suffusa infundibuliformi-campanulata variculosa et maculata. Stamina 10 corolla breviora; filamenta basi puberula. Gynaeceum corolla brevius, staminibus longius; ovarium floccosum et glandulosum; stylus glaber. Species Seriei Albertseniani.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **14,140.** July 1917.

4731 **Rhododendron truncatulum,** Balf. f. et Forrest.

Frutex ad 2 m. altus. Folia elliptica vel ovalia nunc subobovalia apice rotundata vel subtruncatula vel subretusa mucronulato-apiculata ad 10 cm. longa (petiolo 2.5 cm. incluso) 4.5 cm. lata; supra olivacea subopaca; subtus pallide fulva glandulis caulifloris conspersa. Umbella circ. 5-flora; pedicelli ad 3 cm. longi divaricati stricti glandulosi. Calycis lobi flavido-virides ovati vel oblongi obtusi ad 3 mm. longi dorso margineque glandulosi. Corolla flavido-alba roseo-suffusa vel pallide rosea leviter kermesino-maculata evariculosa glabra. Stamina corolla multo breviora glabra. Discus minute puberulus. Gynaeceum corollam subaequans; ovarium glandulosum; stylus infra medium glandulosus. Species ex phylo *Rh. cymbomorphi*, Balf. f. et Forrest.

Western N.W. Yunnan. Mekong-Salween divide. Forrest. **13,936.** June 1917.

Rhododendron wuense, Balf. f.

Frutex ad 6 m. altus ramis crassis indumento denso crasso primo ferrugineo e pilis corniculiformibus floccosis constructo vestitis. Folia petiolata ad 10 cm. longa saepe minora ; lamina crasse coriacea oblongo-ovalis vel ovalis ad 8.5 cm. longa 4 cm. lata breviter rostrata mucronata margine recurva basi rotundata vel cordulata ; supra atroviridis opaca in modum squali corii minute rugulosa glabra (maturitate), costa media basi elevata et tomentosa sursum anguste sulcata et puberula excepta ; subtus indumento rufo-ferrugineo e pilis cylindricis longe ramosis acutis intertextis aedificato ubique dense vestita, costa media glandulas rubras longe stipitatas gerente ; bracteae sub anthesi deciduae ; petiolus circ. 1.5 cm. longus ut caulis vestitus. Umbella breviter racemosa pauciflora rhachi puberula circ. 1 cm. longa ; pedicelli circ. 1.5 cm. longi glanduloso-floccosi. Calyx ad 1 cm. longus inaequaliter 5-partitus ; cupula dense glandulosa ; lobi oblongo-ovales dorso glabri margine breviter glanduloso-ciliati. Corolla elongato-campanulata ad 3.5 cm. longa ; lobi circ. 1 cm. longi 2.2 cm. lati emarginati. Stamina 10 inaequalia corolla et gynaeceo multo breviora ; filamenta puberula. Discus glaber. Gynaeceum corolla brevius ; ovarium petasiforme pilis rufis fasciatis ascendentibus et glandulis stipitatis brevioribus dense vestitum ; stylus basi glandulosus. Species Seriei Edgeworthii.

Western China. Mt. Wu. Wilson. **3960.**

Rhododendron yaragongense, Balf. f.

Frutex nanus erectus multiramosus parvifolius. Ramuli (incrementa annua parva exhibentes) annotini circ. 1 mm. diam. rufescentes indumento asperato squamarum peltatarum secretione rubro-nitente plenarum contertarum induti, seniores nigricantes subverruculosi tandem grisei decorticantes. Alabastra foliaria ovoidea circ. 1.5 mm. diam. ; perulae extimae coriaceae ovatae extus dense lepidotae margine minute ciliatae. Folia petiolata ad 1 cm. longa ; lamina ovalis vel oblongo-ovalis ad 9 mm. longa 5 mm. lata, apice rotundata vix mucronulata nunc subemarginata, margine paullo recurvata, basi obtusa vel subrotundata nec cordulata ; supra atroviridis opaca quasi foveolatim excavata squamis peltatis concavis contiguis membranaceis arescentibus (umbone nunc aurantiaco- vel rubro-tincto) translucentibus obtecta, costa media paullo sulcata ; subtus rufo-fulvida squamis peltatis contiguis et rufescentibus et incoloratis vel parum aureo-annulatis aequaliter intermixtis lepidota, squamis uniformibus ex umbone lato institaque integra aequilata constructis, costa media et venularum reti occultis ;

petiolus circ. 1 mm. longus ut ramuli lepidotus. Umbella compacta terminalis ad 3-flora ; bracteae exteriores crustaceae rotundatae vel late ovatae apiculatae dorso lepidotae et puberulae intus apicem versus sericeae lanato-ciliatae, interiores rotundatae late membranaceo-marginatae subtruncatae, intimae tenuiter membranaceae spathulatae circ. 5 mm. longae 2.5 mm. latae truncatae cucullatae ut exteriores indutae ; bracteolae filiformes subclaviformes circ. 2 mm. longae pedicellis longiores epilosae dorso sparsim lepidotae ; pedicelli brevissimi circ. 1 mm. longi lepidoti. Calyx cupularis parvus vix 1.5 mm. longus 5-partitus ; cupula dense lepidota ; lobi inaequales triangulares vel deltoidei obtusi vel subacuti dorso lepidoti ciliati nunc subfimbriati, majores ad 1.25 mm. longi 1 mm. lati. Corolla roseo-lilacina circ. 1.2 cm. longa extus elepidota epilosa ; tubus brevis latus circ. 4 mm. longus infundibuliformis fauce puberulus in limbum 5-lobatum expansus ; limbi discus circ. 2 mm. longus ; lobi subaequales tenues oblongo-ovales circ. 6 mm. longi 5 mm. lati undulati. Stamina 10 alternatim longiora et breviora, longiora circ. 1 cm. longa ; filamenta supra basim nudam 1.5 mm. longam pilis os corollinum implentibus annulatim villosa ; antherae ovoideae 1 mm. longae roseo-tinctae. Discus sub ovario dense puberulus. Gynaeceum staminibus brevius circ. 6 mm. longum ; ovarium circ. 2.5 mm. longum cylindricum truncatum paullo sulcatum imbricatim et laxe lepidotum squamis albidis nunc pallide fulvidis ad apicem paullo piloso-cristatum ; stylus roseo-lilacinus glaber sub stigmate lobulato haud expansus sed labium circulare faciens. Species Seriei Lapponici.

W. Szechwan. Principality of Batang (Yaragong). Zeda de Yaragong. Soulié. **3709.** June–July 1904. In Herb. Paris.

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NOTES

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BOTANICAL GARDEN
JAN25 1922

Some Asiatic Sedums in the Edinburgh Herbarium; with supplementary notes from Kew and the British Museum.

BY

R. LLOYD PRAEGER, B.A.

With Plates CLXX-CLXXIX and One Figure in the Text.

THE majority of the sheets of the large collection of Asiatic Sedums preserved at Edinburgh have been examined by M. Hamet, and his determinations have been published in part.* The present notes deal with the remainder of the Asiatic sheets, including G. Forrest's more recent collections in Yunnan made after 1913, and some interesting Chinese and Burmese plants obtained by F. Kingdon Ward and Reginald Farrer. It has been found necessary to review a few of M. Hamet's determinations, in most cases because I regard as distinct a few plants which he had placed, in most cases tentatively, under species already described. A similar revision has been made in the case of a few of the plants of Forrest's first expedition, as published by Diels.†

An examination of the Sedums in the Léveillé Herbarium (now at Edinburgh) and of Hamet's comments on these plants reveals the identity of some of Léveillé's very inadequately described species, and furnishes other useful material. One of the Léveillian species (*S. Chaneti*), which could not be identified from his description, proves to be identical with a plant subsequently described by myself as *S. pyramidale*. My name is in consequence withdrawn, but my description will be found useful. The issue was confused in this case by the fact that (on Hamet's determination, as the label on the specimen shows) Léveillé had withdrawn this species, identifying it with *S. spinosum*, Thunberg, a quite different plant. Two other names of mine, *S. Mairei* and *S. triphyllum*, are also withdrawn, specimens in the Léveillé collection named by Hamet showing that they are identical with his *S. Someni* and *S. Chauveaudi* respectively.

* Notes Roy. Bot. Gard. Edin., v, 115; viii, 140.
† Ibid. vii.

(101D) Wt. 14883/161 9/21 375 J.P. G7 Sc.B

In the present paper 12 new species are described and figured, of which 8 belong to the section Rhodiola, which is essentially Asiatic in distribution, and is proving to be extensively developed in the W. China-Tibet region, and to offer there many interesting and puzzling forms. The additional members of it now studied have not led me to alter the tentative views I expressed in a recent paper * as to the extent and classification of this difficult and complicated group. At the one end of the series, which I take to be the most evolved, stand *S. roseum* and its allies; at the opposite end the Rhodiolas appear to pass into the Seda Genuina, forms like *S. limuloides* having affinities in its growth-form (on which the classification of Sedums has always been based, the flowers providing no sure ground for sub-division) to Rhodiolas like *S. Praegerianum* and *S. Balfouri* on the one hand, and on the other to some of the Mexican Seda Genuina.

The following notes relate only to sheets now for the first time determined, or of which previous determinations are revised. Plants which were already correctly named in the collections are not included, except where, as in the case of *S. Leveilleanum* or *S. orichalcum*, their characters and affinities are discussed. I have not included additional stations for certain species which are now known to be of common occurrence in the areas concerned.

The information given on the labels is given verbatim, any additional remarks by myself being included in parenthesis.

S. alboroseum, Baker.

(1) Shangtung : I-tu-ksien, Ching-chou-fu. Recd. 1895. Coll. S. Couling, No. 69. Hsieh tsu tsao. Cures scorpion bites.

(2) Shangtung : Taian-fu, T'ai Shan Mountains, September 1912. Mary Strong Clemens, No. 1395. (As *S. Telephium*).

(3) Chihli : Tientsin, Oct. 7, 1912. Mary Strong Clemens, No. 1810 "Pink flowers in our compound." (As *S. Telephium*).

S. Alfredi, Hance.

(1) Yunnan : Sedum vivace. Fl. jaunes. Rochers mousseux, vallée de Long-ky, alt. 700 m. Septembre. E. E. Maire.

(2) Kiangsi : Kewkiang Hills, 22 May, '92. Yellow flower. Herb. of W. R. Carles, No. 174.

In the first-mentioned plant (Maire) the inflorescence is very strong, and the leaves, while frequently normal (as figured in Proc. R. Irish Acad. xxv, Sect. B. pl. iii), tend to be shorter and broader, with a retuse, not pointed, apex. In the latter sheet (Carles) these features are emphasised, all the leaves being

* Trans. Bot. Soc. Edin. xxvii, 107.

retuse and only twice as long as broad, instead of thrice or more. The leaves are moreover opposite, not alternate as they are normally, but the flowers are typical. A similar tendency to retuse apices in leaves normally of very similar shape is found in the Mexican *S. oxypetalum,* H.B.K.

S. algidum, Ledeb.

(1) Szechuan : Herb 6″–1 ft. Flowers whitish, midst rocks around Tachien-lu, W. Szechuan. Alt. 13,000–14,500 ft. 9.08. E. H. Wilson, No. 2498. (Under *S. algidum,* but flowers unusually small).

(2) Yunnan : vivace, naine, fl. jaunes. Pâturages du Io-chan, alt. 3300 m. Juin. E. E. Maire, No. 680. 1914. (A small form with unusually small flowers).

(3) Yunnan : Vivace. Tiges et fleurs jaunes. Pâturages de Ta-hai, alt. 3200 m. Juillet. E. E. Maire, No. 262/1913. (A large plant with the narrow leaves and long stamens of var. *tanguticum,* Maxim. but the short ovaries in the male flower of var. *jeniseense,* Maxim.)

S. algidum, Ledeb., var. **tanguticum,** Maxim.

(1) Szechuan : West Szechuan and Tibetan frontier; chiefly near Tachien-lu, at 9000–13,500 ft. Coll. A. E. Pratt, No. 105. (As *S. asiaticum,* DC.) (There is a sheet of the same gathering at Kew).

(2) W. China : Sedum. Wet rocks, 11–12,000 feet. 7.03. E. H. Wilson, No. 3620.

Sedum ambiguum, Praeger, sp. nov. (Plate clxx, 1).

Species anomala sectionis Sedorum Genuinorum caudice elongato ut in Rhodiola insignis, sed caudicis apex nanus, nec squamosus. *S. Ewersii,* Ledeb. et speciebus nonnullis aliis sectionis Telephii subsimilis, sed radices non tuberosae. Foliis crassissimis rosulatis, petalis erectis atque staminibus quinque *S. indico,* Hamet subsimilis, sed habitu perenni (nec bienni), sepalis quam petala longioribus vel ea aequantibus (nec multo breviori-bus), squamis nectariferis minutis semi-ellipticis integris (nec amplis oblongo-quadratis emarginatis) differt.

Herba perennis, glabra, carnosissima, caules steriles edens. *Radices* fibratae. *Caudex* ramosus, ramis 3–6 cm. longis, gracilibus, 3 mm. crassis, argenteis, hypogeis, decumbentibus vel adscendentibus. *Rami steriles* laterales, breves, apice folia in rosulas disposita ferentes. *Rami floriferi* terminales, erecti, simplices, graciles, sparsim foliosi, 7–10 cm. longi. *Folia ramorum sterilium* plana, alterna vel opposita, conferta, sessilia, in-

tegra, carnosissima, orbicularia vel orbiculari-obovata vel orbiculari-rhomboidea, apice rotundata vel apiculata, 9–12 cm. longa et lata, supra et subtus in sicco valde argentea. *Folia ramorum floriferorum* alterna vel opposita, plana, sessilia, integra, internodiis breviora, oblanceolata vel oblonga, apice obtusa, 7–9 mm. longa, 1.5–3 mm. lata. *Inflorescentia* corymbiformis, laxa, 12–25 mm. longa, 25–35 mm. lata, sparsim bracteata; bracteae foliis similes sed minores, lineari-oblongae, obtusae. *Flores* hermaphroditi, 5-meri, anguste campanulati, 4 mm. longi, in vivo pulchre rosei, in sicco pulchre purpurei, pedicellati; pedicelli floribus plerumque longiores, sursum incrassati, purpurei. *Sepala* fere libera, aequilonga, erecta, carnosissima, oblongo-linearia, obtusa, 3.5–4 mm. longa, (raro 2.5–3 mm. longa), .75–1 mm. lata. *Petala* sepalis plerumque breviora, raro ea aequantia, erecta, ovato-deltoidea, acuta, 2.5 mm. longa, 1 mm. lata. *Stamina* 5 episepala, antheris amplis .7 mm. longis, filamentis 1.3 mm. longis, longissime deltoideis. *Squamae nectariferae* minutae, semi-ellipticae, integrae, .5 mm. longae et latae. *Carpella* robusta, erecta, 2 mm. longa, stylis brevibus erectis capitellatis.

(1) Yunnan : Mekong Valley, arid region, 7000 feet. June 1913. F. Kingdon Ward, No. 391.

(2) Yunnan : Mekong Valley. Lat. 28° 30′ N. Alt. 6000–7000 ft. June, 1917. Plant (succulent) of 3–5 inches. Flowers bright rose. Open dry rocks and rocky slopes. G. Forrest, No. 15,049.

(3) Szechuan : Szechuan austr. reg. Knapic prope Tatiao Ko, in rupestr. calc.; fl. rubri et paullo violacei. May 23, 1914. Alt. circiter 2800 m. C. Schneider, No. 1362.

A curious plant, apparently nearest to *S. indicum,* Hamet. The material is poor as regards the barren shoots, the indications are that they continue growing slowly with rosulate foliage probably for more than one year, and then shoot up, flower, and die, being replaced by offsets at their base; this growth-form is close to that found in the Mexican Sedums of the group *Sedastrum,* Rose, which the present plant also matches in its broad, entire, very fleshy leaves. The plant is known by its very fleshy, round leaves, silvery on both sides when dry, bright rose flowers and pedicels (bright purple when dry) and oblong, erect sepals exceeding or equalling the erect petals. The bright red coloration of the inflorescence—unusual in the Seda Genuina—is caused mainly by the high pigmentation of the sepals and pedicels.

In the general form of the flower and in its five stamens in particular the plant recalls *S. indicum,* especially the curious form named var. *Forresti* by Hamet, which has similarly some of the leaves nearly orbicular and opposite; it is a tall, straggling plant of which the only specimen *looks* like a perennial. But

it has the characteristic short deltoid sepals of *indicum*, not the oblong sepals at least equalling the petals of *ambiguum*. I grew for some years *indicum* and its vars. *yunnanense* and *densirosulatum*, and the flowers displayed no marked variation in respect to their sepals, and they were uniformly biennial, forming a Sempervivum-like rosette in the first year and a central flowering stem in the second.

S. angustum, Maxim.

N.W. Yunnan : A-tun-tsu. Dry shrub belt, 12,000–13,000 feet. 17.8.13. F. Kingdon Ward, No. 1051.

Sedum atuntsuense, Praeger, sp. nov. (Plate clxx, 2).

Habitu *S. quadrifidi*, Pall., sed foliis latis (nec linearibus) valde differt. Ab *S. fastigiato*, H.f. et Thoms. foliis oblongo-ovatis basi cuneatis (nec linearibus nec oblongo-lanceolatis basi latis) distinguitur. *S. venusto*, Praeger (*infra*) subsimilis, sed statura minore, staminibus brevioribus vix adnatis, squamis semi-ellipticis integris (nec subquadratis emarginatis) distincta. *S. gelidum*, Ledeb. foliis oblongis plerumque dentatis, staminibus alte adnatis, squamis emarginatis differt. *S. Bouvieri*, Hamet caulibus foliisque papillis longis obtectis facile separandum.

Herba perennis, glabra, caules steriles non ēdens. *Caudex* erectus, pauciramosus, 3–5 cm. longus, 12 mm. latus, caulibus emarcidis obtectus, apice caules floriferos basi squamis cinctos ferens. *Squamae* deltoideo-semiorbiculares, acutae, paleaceae. *Caules* annui, multi, simplices, erecti, glabri, teretes, foliosi, circa 4 cm. longi. *Folia* alterna, glabra, internodiis breviora, sessilia vel subpetiolata, oblongo-ovata vel late oblongo-lanceolata, marginibus integris, apice obtusa, basi cuneata, in calcar non producta, circa 6 mm. longa, 2.5 mm. lata. *Inflorescentia* terminalis, densa, subumbellata, involucrata e ramulis circa 5 unifloris quam flores paulo brevioribus bracteam nonnunquam ferentibus composita. *Flores* hermaphroditi, 5-meri, pulchre lutei. *Calyx* 2.5–3.5 mm. longus, segmentorum parte libera 1.5–2.5 mm. longa basi 1 mm. lata lineari vel lanceolata, obtusa. *Petala* suberecta, oblonga vel oblongo-lanceolata, obtusa, 3·5–4·5 mm. longa, 1 mm. lata, parte concreta brevissima, nervo medio in mucronem apicem superantem prolongato. *Stamina* petala aequantia, epipetalorum parte adnata .5 mm. longa. *Squamae nectariferae* circa 1 mm. longae, semi-ellipticae, paulo longiores quam latiores, minute emarginatae. *Carpella* erecta, oblonga, cum stylis 2.5 mm. longa : styli 1 mm. longi.

(1) N.W. Yunnan : A-tun-tsu, alpine rocks, 14–15,000 feet. 1911. F. Kingdon Ward, No. 37.

(2) A-tun-tsu : screes, 16,000 feet. Flowers yellow, cushion. 6.8.13. F. Kingdon Ward, No. 962.

Sedum Barnesianum, Praeger, sp. nov. (Plate clxxi, 1).

Sectionis Rhodiolae species humilis e serie Primuloides Praeger, quae grex caudicis foliis bene evolutis distinguitur. *Sedo Levii*, R. Hamet est proxima, sed caudicis squamis longe deltoideis nullis, caudicis foliorum lamina lineari-rhomboidea (nec ovata), ramis floriferis horizontalibus (nec erectis), foliis ramorum floriferorum linearibus (nec ovato-oblongis), sepalis caudato-acuminatis (nec acutis), petalis caudatis (nec obtusis), squamis nectariferis quadratis (nec duplo latioribus quam longioribus) distinguitur.

Herba perennis, glabra, ramis sterilibus nullis. *Caudex* erectus, simplex, brevis, crassus, 1–2 cm. longus, ad 1 cm. latus, foliis ramisque floriferis et emarcidis et vivis coronatus. *Caudicis foliorum emarcidorum* laminae dilapsae, petioli persistentes, erecti, lineares, plani, truncati, nigrescentes, annulum densum circum gemmulam formantes. *Caudicis folia viva* pauca (4–8), erecta, petiolata, integra; petiolus linearis, planus, 9 mm. longus, .75 mm. latus, basi paulum dilatatus; lamina lineari-oblanceolata vel lineari-rhomboidea, acutiuscula, 6 mm. longa, 1.5 mm. lata. *Rami floriferi* pauci (2–6), simplices, graciles, 2.5 cm. longi; parte inferiore nudi, erecti, parte superiore foliosi, horizontales, apicibus adscendentibus. Rami floriferi vetusti subpersistentes, adscendentes. *Ramorum floriferorum folia* conferta, sessilia, integra, plana, lineari-rhomboidea, subacuta, 4–5 mm. longa, 1 mm. lata, apice et basi angustata. *Flores* solitarii, hermaphroditi, 5-meri, campanulati, albi vel albidi. *Sepala* libera, ovato-oblonga, caudato-acuminata, viridia, 3 mm. longa, 1.5 mm. lata. *Petala* libera, suberecta, ovata, apice caudata, 4.5 mm. longa, 2 mm. lata. *Stamina* 10; episepala 3 mm. longa; epipetala 2.5 mm. longa, triente adnata. *Squamae nectariferae* quadratae, .75 mm. longae et latae, apice subretusae. *Carpella* erecta, gracilia, rubescentia, in stylos breves attenuata, 2.5–3 mm. longa.

(1) Himalaya : Kalaeree, East Himalaya, 16,000 feet. 12.9.12. Coll. Rohmoo Lepcha, No. 434.

(2) Phari, Chumbi Valley, East Himalaya. 14,000 feet. 20.9.16. Coll. Native Collector.

This little plant is an addition to the interesting group of Sedums of which *S. primuloides*, Franch. and *S. Praegerianum* W. W. Sm. are examples, and which, as I have endeavoured to show,* belongs to the section Rhodiola and consists of primitive

* Praeger (R. Ll.), Trans. Bot. Soc. Edinb. xxvii, 107.

forms in which the caudex-leaves have not degenerated into scales, as in the better known members of the section. It is thus allied to *SS. Praegerianum*, W. W. Sm., *Mossii*, Hamet, *Levii*, Hamet, *Karpelesae*, Hamet, *Hobsonii*, Hamet, *Durisii*, Hamet, *Balfouri*, Hamet, *primuloides*, Franch., *pachyclados*, Aitch. and Hemsl., and *Leveilleanum*, Hamet, but is easily distinguished from all of these. Thus, *pachyclados* and *primuloides* have slender elongate branched caudices (not very short, thick, simple); *pachyclados*, *primuloides*, *Karpelesae*, *Levii* and *Durisii* have caudex-leaves with a very broad (not linear-rhomboid) lamina, and in the last-named the leaves are pilose (not glabrous); *Karpelesae* has stem-leaves subverticillate (not alternate); *Balfouri* and *Mossii* are much taller plants with flower-stems respectively 30 and 10 cm. (not 2.5 cm.) long, and in the former the leaves are ciliate; *Hobsonii* has ovate-oblong (not linear-rhomboid) caudex-leaves, and it and *Levii* have ovate (not linear-lanceolate) stem-leaves; *Leveilleanum* has broader cuspidate (not subacute) caudex-leaves and many erect (not few horizontal) flower-stems; *Praegerianum* is a plant 3–4 times as large with caudex bare of old leaves and very erect red petals. *S. Barnesianum* resembles *Leveilleanum* and *Levii* in its dense external ring of dead leaves, but in the former the whole leaf (not merely the petiole) is persistent, and in the latter the deciduous lamina is ovate (not linear-rhomboid). It resembles *Karpelesae* and *Levii* in its solitary flowers, all the other members of the group having several or many flowers on each stem. It resembles *Praegerianum* in habit, especially in its horizontal flower-stems.

The species is dedicated to Miss Eileen Barnes, to whose industry and skill I owe drawings of nearly two hundred species of Sedum.

S. Beauverdi, Hamet.

(1) Yunnan : Hills around Tengyueh. Lat. 25° N. Alt. 6000 feet. Tufted plant of 1–2 inches. On dry rocks. July 1912. **Forrest, No. 8323.**

(2) Yunnan : Tali Range. Lat. 25° 40′ N. Alt. 11,000 feet. Tufted plant of 2–3 inches. Flowers brassy-yellow. Ledges and crevices of cliffs and on humus-covered boulders. Sept. 1913. Forrest No. 11,711.

S. Bergeri, Hamet.

"Yunnan : Leg. Ducloux. 2263. Herb. Mus. Paris."

S. bhutanicum, Praeger, nom. nov.

S. Cooperi, Praeger (1919) nec Clémenc. (1868).

(1) Himalaya : Kapup, Sikkim. Alt. 12,000 feet. 5.7.13. Yellow, among stones and gravel. Cooper, No. 166.

(2) Himalaya : Guicha-La, E. Himalaya, 16,000 feet. 12.8.13. Coll. Rohmoo Lepcha, No. 1002.

(3) Himalaya : Palansgarh, Byans, about 10,000 feet. July 19, 1886. Presented by J. R. Reid. (As *"Sedum ? Royleii"*—a *nomen nudum*).

(4) N.W. Yunnan : On rocks, 13,000 feet, A-tun-tsu. 1913. F. Kingdon Ward, No. 564 (in part).

(5) Yunnan : Forrest, No. 2492. (See *supra* v, p. 120, where it is recorded as *S. bupleuroides*, Wall. by Hamet ; also *supra* vii, p. 135, where it is named *S. bupleuroides*, Wall. (?) by Diels).

(6) N.W. Yunnan : Mountains north of A-tun-tsu. Lat. 28° 35′ N. Alt. 14,000 feet. Plant of 2–4 inches. Flowers deep dull crimson. On humus-covered boulders in shady situations. G. Forrest, No. 14,071.

The following additional records are included here with some doubt. The *bupleuroides* group, to which *S. bupleuroides, S. bhutanicum,* and *S. discolor* belong, is difficult, and the species (as is the way of Rhodiolas) offer no constant characters by which they may be separated readily in all cases :—

(7) N.W. Yunnan : A-tun-tsu. On rocks, 13,000 feet. 1913. F. Kingdon Ward, No. 564. (Poorly developed, probably shade grown. Leaves small and shortly stalked and rootstock slender, in these characters approaching *S. discolor*).

The following are in Herb. Kew :—

(8) Chumbi—Kangboo, 2 Aug. 1882. Flowers pink. Coll. Dungboo.

(9) Phari. July 1879. Fl. orange. Coll. Dungboo. (In these two gatherings the leaves are narrower than in type and glaucous below, approaching *discolor*. But they have the moderately thickened rootstock which belongs to *S. bhutanicum*.

S. Bouvieri, Hamet.

(1) Himalaya : Sedum sp. n. Height above Chahlek, Byans, about 12,000 feet. July 23, 1886. Pres. by J. R. Reid, C.I.E.

(2) W. Nepal : Sedum sp. n. Rocks in Nampe Gadh, Nepal. 13,000 feet. 27.7.86. J. F. Duthie, Coll. No. 5565.

There is a sheet of the second gathering in the Kew Herbarium, accompanied by good drawings of the female flower by Miss M. Smith. It is labelled, "Sedum near *linearifolium*" ; to which is added, "Rather *S. coriaceum*, Wall.—J. F. D."

S. bracteatum, Diels.

(1) Yunnan : Plante annuelle tendre. Fl. jaunes. Vallons

humides boisés de To-ch'an. Alt. 3200 m. Août. E. E. Maire, No. 1016/1913.

(2) Yunnan: Western flank of the Shweli-Salwin divide. Lat. 25° 20′ N. Alt. 10,000 feet. Plant of 3–6 inches. Flowers yellow. On rocks. August 1912. Forrest, No. 8982.

(3) Yunnan: Mountains in the N.E. of the Yangtze bend. Lat. 27° 45′ N. Alt. 10,000 feet. Plant of 4–8 inches. Flowers golden-yellow. Open shady situations on rocks. Aug. 1913. Forrest, No. 10,954.

(4) Upper Burma: Fls. bright yellow. On shady banks with other undergrowth, forest, 10,000 feet. 12.8.14. Hpimaw Pass. F. Kingdon Ward, No. 1878.

(5) Upper Burma: Hpimaw Pass. Alt. 10,500 feet. June 13, 1919. Sedum sp. Damp cool moss banks near Hpimaw Pass. R. Farrer, No. 1026.

S. Celiae, Hamet.

Three gatherings from Tong-tchouan, alt. 2600–2700 metres. E. E. Maire.

S. Chauveaudi, Hamet.

(1) Shantung. Rev. Alex. Williamson, 1864.

(2) Yunnan: Sedum vivace. Fl. jaunes. Rochers au pied des montagnes à Tong-tch'ouan Alt. 2550 m. Oct. E. E. Maire, No. 601/1913.

(3) Yunnan: Sedum annuelle. Fl. jaunes d'ocre. Toitures et tertres à Tong-tch'ouan. Alt. 2500 m. Novembre. E. E. Maire.

Sedum concinnum, Praeger, sp. nov. (Plate clxxii, 2).

Species e grege Rhodiola, *S. roseo,* Scop. subsimilis sed minuta; caudicis squamis imbricatis regulariter dispositis, caulibus dense mammillatis pollicaribus, foliis obovatis inferioribus integris superioribus saepe margine sinuosis, cymis paucifloris notata.

Herba perennis, glabra. *Radices* longae, crassae vel graciles. *Caudex* erectus, ramosus, ramis 2–3 cm. longis, gracilis, 5 mm. crassus, caulibus vetustis haud obtectus, squamis deltoideis acuminatis carinatis regulariter imbricatis 2 mm. longis 2 mm. latis dense indutus, apice caules floriferos ēdens. *Caules* pauci, erecti, simplices, graciles, 2.5 cm. longi, .5–.75 mm. crassi, undique dense mammillosi, infra medium nudi vel folia paucissima minutissima ferentes, supra medium foliosi. *Folia* alterna vel subopposita, plana, viridia, 5–7 mm. longa, 2.5 mm. lata, late obovata vel obovato-rhomboidea vel obovato-oblonga vel

obovato-lanceolata, apice rotundata, basi cuneata; inferiora integra breviter petiolata, petiolis mammillatis; superiora sessilia marginibus saepe sinuata. *Inflorescentia* 1–3-flora, pedicellis gracillimis purpureis flores aequantibus. *Flos* ♂ :—*Sepala* 4, oblonga, obtusa, 1.75 mm. longa, .5 mm. lata, basi purpurea, apice aurea. *Petala* 4, oblongo-linearia, obtusa, 2.5 mm. longa, .6 mm. lata, reflexa, aurea et purpurea. *Stamina* 8, 2.25 mm. longa, epipetala sextante adnata; filamenta purpurea. *Squamae nectariferae* oblongae, emarginatae, .5 mm. longae, .3 mm. latae, reflexae, purpureae. *Carpella* 4, 1.2 mm. longa, vacua.

Yunnan: Lichiang Range, lat. 27° 25′ N. Alt. 12,000 feet. June 1913. Plant of 1–2 inches. Flowers ruddy-green. Open limestone rocks. G. Forrest, No. 10,319.

A very elegant plant, recalling especially in its flowers a tiny *S. roseum*, but differing from the *roseum* group in its well-developed caudex-scales.

S. coreense, Nakai.

"Affine *S. polystichoides* ("*polytrichoides*"), sed folia sunt latiora et laxa. Caulis simplex v. ramosus 4–15 cm. altus carnosus, inferne squamis rubris ellipticis 2–4 mm. longis obtectus et praecipue circa basin imbricato-obtectus. Folia oblanceolata-linearia v. oblanceolata carnosa viridia sessilia 1–1.5 cm. longa, 2–2.5 mm. lata. Cyma 2–3 cm. lata oligoflora. Flores sessiles flavi pentameri. Sepala angusta 1 mm. longa. Petala 2.5 mm. longa angusta. Corea: Imsil, viii. 1912. (T. Mori, No. 132). In silvis insulae Wangtô 20.vi.1913. (T. Nakai No. 799)." Fedde Repertorium xiii, 272–3.1914.

Nakai's description is meagre, especially as regards the flower, and may be amplified from a good series of Corean specimens of Faurie's and Taquet's collecting in Herb. Léveillé (named in all cases *S. polytrichoides,* Hemsley).

Plant perennial, tufted. Barren shoots quite short, with leaves crowded at apex. Lower leaves of the flowering shoots small, and with those of the previous season persistent and withering, forming the "squamae rubrae" of the description.

Inflorescence of 2–3 simple or forked 3–4-flowered branches. Sepals deltoid, blunt, 1.5 mm. long, 1 mm. wide at base. Petals elongate, lanceolate-deltoid, rather blunt, 5 mm. long, with a mucro falling short of the tip. Stamens 2.5 mm. long, the epipetalous ones inserted near base. Scales spathulate, emarginate, only .25 mm. long. Carpels 3 mm. long, tapering into the styles.

The main points of difference with Nakai's diagnosis are in the sepals and petals, the latter being twice as long as in his

description; but his too brief notes on the flower probably point to poor material or inadequate observation. With the main points of his description the specimens agree.

Corea: (1) In rupibus montium, Naipiang, Julio 1901. U. Faurie, No. 276. (2) In rupibus littoris Ouen-san, Junio 1906. U. Faurie, No. 633.

Quelpaert: (1) In rupibus Quelpaert, Junio 1907. U. Faurie, No. 1807. (2) In rupibus Hallaisan, 1400 m., 12 Aug. 1908. E. J. Taquet, No. 817. (3) In rupibus Hallaisan, 1500 m., 25 Aug. 1911. E. J. Taquet, No. 5612.

S. crassipes, Wall.

(1) Upper Burma: Imaw Bum. Alt. 13,000 ft. Lat. 26° 10′ N. Long. 98° 30′ E. 27.7.19. Sedum. Flowers palest yellow or cream. Anthers red. On boulder screes among scattered shrub-growth; or amongst dwarf Rhododendrons. F. Kingdon Ward, No. 3426.

(2) Yunnan: Western flank of the Shweli-Salwin divide. Lat. 25° 20′ N. Alt. 11,000 feet. Plant of 6–16 inches. Flowers dull brassy-yellow. In crevices of cliffs and on humus-covered boulders. Aug. 1912. Forrest, No. 9015.

Sedum Cretini, Hamet, **(Plate clxxi, 2).**

(1) Himalaya: Guicha La, East Himalaya, 16,000 feet. 12.8.13. Coll. Rohmoo Lepcha, No. 1007 (female plants in flower).

(2) Himalaya: Guicha La, 15,000 feet. 1913. Coll. Ribu and Rohmoo, No. 6633 (female plants in immature fruit).

This species was recently (Journ. of Bot. liv (1916) Suppl. pp. 16-18) described by Hamet from plants collected in Sikkim by Smith and Cave in 1909 (Nos. 1206, 1299) at 12,000–16,000 feet. The specimens, which are very fully described, are all male. The species is remarkable among the Rhodiolas for having a slender branched rhizome which emits many slender suckers, which on coming to the surface give rise to a new tuft of flowering shoots. Among described species of Rhodiola this habit is unique, but as figured in a forthcoming paper in Journ. Roy. Hort. Society a plant of *S. crassipes,* Wall. in my garden behaved in an exactly similar manner. Another of similar habit, *S. discolor,* is mentioned in the present paper. Some other species (e.g., *S. himalense,* Don) are capable of sending out slender sucker-like shoots if the rhizome is injured below the ground: these, on reaching the surface, proceed to develop flowering shoots from the axils of their scale-leaves, and the sucker thickens and elongates into a normal aerial caudex. As *S. Cretini* is re-

markable among Rhodiolas, the female plant is figured here, and the female flower described.

Flos ♀ :—*Sepala* libera, linearia, obtusa, 4 mm. longa, .8 mm. lata. *Petala* libera, lineari-oblanceolata, obtusa, 4.5 mm. longa, 1.2 mm. lata. *Stamina* nulla. *Squamae nectariferae* quadratae, emarginatae, .75 mm. longae et latae. *Carpella* 6.5 mm. longa, in stylos capitellatos divergentes angustata.

S. Cretini is closely related to *S. crassipes*, Wall., and two of the more obvious characters by which it is distinguished—its soboles and its dioecious flowers, are not unknown in abnormal forms of that species. But its caudex appears never to become thick and aerial, each crown being short-lived; its flower-stems are much shorter, its leaves shorter and broader, and only the upper ones slightly toothed. Of flower characters it is not possible to speak with certainty, as the floral parts in both species are variable in shape and relative length, and abundant material would be necessary for adequate comparison.

There are two sheets of this species in Kew Herbarium. One, displaying the typical plant (♀) is of J. D. Hooker's collecting, from Lachen, Sikkim, 12,000–14,000 ft., June 20 and July 14, 1849. It is labelled by Hooker "*S. crassipes*, Wall. (plant junior)" and by C. B. Clarke "*S. asiaticum*, DC. Fl. Ind. ii, 419" (which = *crassipes*, Wall., not *asiaticum*, DC.) The other (also ♀) is from "Tongolo, Principauté de Kiala, Thibet Oriental," J. A. Soulié, 1893 (No. 325). While possessing the slender branching rhizomes and unisexual flowers of *S. Cretini*, its stems are taller than in the type (8–16 cm. instead of 3–5 cm.), and its leaves longer and more toothed; in these respects it varies towards its close ally *S. crassipes*. This second plant, and the stoloniferous form of *crassipes* referred to above, suggest that *S. Cretini* might be more correctly placed under *S. crassipes* as a variety.

S. discolor, Franchet. (Plate clxxiii).

Four sheets in the Edinburgh herbarium and one at Kew are best placed here, but Franchet's description must be amplified to receive them. His diagnosis, founded on two gatherings of Delavay (Nos. 3691, 3771) describes the plant as hermaphrodite, many-stemmed, leaves 2–3 mm. broad with a few teeth at the apex, and carpels 4 mm. long. The gatherings which I have seen include both dioecious and hermaphrodite plants characteristically single-stemmed or at most 2–3-stemmed, with leaves 3–5 mm. broad, toothed throughout their length or more rarely entire, and carpels (in the female and hermaphrodite plants) only 1.5–2 mm. long, in fruit 3–4 mm. long. In other features the

plants agree with *discolor* as far as is to be expected in this variable group. As Franchet's description is somewhat short and includes only the hermaphrodite plant, I append the description and figure which I had prepared before it had appeared that the specimens might be placed under *S. discolor,* amplifying from Franchet where required by notes in parenthesis.

Species *S. bhutanico,* Praeger, *S. purpureoviridi,* Praeger, *S. bupleuroiden,* Wall. consanguinea. *Sedo bhutanico* proxima, sed caudice gracili repente (nec crasso erecto), foliis minoribus angustioribus brevipetiolatis (nec sessilibus) subtus glaucis (nec viridibus), sepalis floris feminini deltoideis (nec linearibus), squamis floris masculini multo minoribus, carpellis floris masculini multo majoribus, differt. A *S. purpureoviridi* caulibus foliisque glabris (nec pubescentibus), caudice gracili repente, (nec crasso erecto) etc. differt. A *S. bupleuroide* caudice gracili repente (nec crasso erecto), foliis angustioribus brevipetiolatis (nec sessilibus) plerumque dentatis (nec integris) subtus glaucis (nec viridibus) marginibus revolutis (nec planis), etc. differt.

Herba perennis, glabra, caules steriles non edens. *Caudex* gracilis, sinuosus, elongatus, ramosus, hypogaeus, 3–5 mm. diametro, in senectute apice ad 5–8 mm. incrassatus, per longitudinem radices fibratas emittens, apice squamas longe deltoideas (ovato-lanceolatas ex Franchet) acuminatas et caules floriferos ferens. *Caules* solitarii, raro bini vel terni (plures ex Franchet), erecti, simplices, glabri, foliosi, 12–40 cm. longi, 1.5–3 mm. crassi; caules vetusti per 2–3 annos nonnumquam persistentes. *Folia* alterna, internodiis longiora, suberecta, oblongo-lanceolata, raro ovato-lanceolata vel lineari-lanceolata vel ovata, (oblongo-linearia ex Franchet), obtuse dentata vel integra, maxima 9–25 mm. longa, 3–5 mm. lata, (2–3 mm. lata ex Franchet), apice acuta vel acuminata, basi auriculata vel rotundata, breviter petiolata, supra viridia, subtus albo-glauca, marginibus revolutis; petiolus 1 mm. longus; folia infima minora, saepe minutissima. *Inflorescentia* cymoso-paniculata, in planta bene evoluta 3–5 cm. longa, 5–10 cm. lata, laxa, in planta minore 1 cm. longa, 1.5 cm. lata, densa, e ramulis circa 4, 2–3-plo furcatis composita, sparsim foliosa, bracteis foliis similibus sed minoribus. *Flores* 4-meri (saepius 5-meri ex Franchet), dioici vel raro hermaphroditi (hermaphroditi ex Franchet), pedicellis breviores. *Flos masculinus* :—*Sepala* longe deltoidea, obtusa, 1 mm. longa, .5 mm. lata, parte superiore erecta. *Petala* oblongo-lanceolata, obtusa, perconcava, patentia vel deflexa, 3 mm. longa, 1 mm. lata. *Stamina* 8, epipetala brevissime adnata, 1.5 mm. longa; episepala 2 mm. longa. *Squamae nectariferae* oblongae, integrae, .5 mm. longae et latae. *Carpella* erecta, 1 mm. longa. *Flos hermaphroditus* :—*Sepala* oblongo-lanceolata, obtusa, 1 mm. longa, .5 mm.

lata, parte superiore erecta. *Petala* ovato-oblonga, sub-acuta, perconcava, patentia vel deflexa, 2.25 mm. longa (3 mm. longa ex Franchet), 1 mm. lata. *Stamina* 8, 2 mm. longa, epipetala brevissime adnata. *Squamae nectariferae* spathulato-cuneatae, integrae, .5 mm. longae et latae. *Carpella* erecta, 1.25 mm. longa (4 mm. longa ex Franchet), stylis incurvatis. *Flos feminus* :—*Sepala* deltoidea, obtusa, 1–2.5 mm. longa, .6–1.0 mm. lata. *Petala* oblonga, obtusa, 2–4 mm. longa, 1.25 mm. lata. *Stamina* nulla. *Squamae nectariferae* cuneato-oblongae, integrae, .6 mm. longae, .5 mm. latae. *Carpella* 2 mm. longa, crassa, erecta, stylis linearibus divergentibus. *Folliculi* erecti, 3–4 mm. longi.

(1) Yunnan : Eastern flank of the Lichiang Range. Lat. 27° 20′ N. Alt. 9000–10,500 feet. June 1906. Plant of 9–12 inches. Flowers reddish-brown, anthers green Dry, stony, open situations, ledges of cliffs, etc. G. Forrest, No. 2441. (Male plant. Recorded as "*S. bupleuroides?*" in Notes R. Bot. Gard Edinb. vii, 131).

(2) Yunnan : Eastern flank of the Lichiang Range. Lat. 27° 15′ N. Alt. 12,000 feet. June 1910. Plant of 4–8 inches. Flowers deep ruddy-green. Open mountain pasture. Forrest, No. 5690. (Female and hermaphrodite plants. Recorded as *S. bupleuroides* in Notes R. Bot. Gard. Edinb. viii, 140).

(3) Sikkim : Changu. Alt. 12,500 feet. 2.7.13. On turf among mossy boulders. R. E. Cooper, No. 128.

(4) Sikkim : Changu. Alt. 12,500 feet. 28.6.13. Amongst mossy boulders old river bed. R. E. Cooper, No. 26.

(The last two not very characteristic—leaves entire and nearly sessile, only slightly glaucous below, and caudex, though horizontal, somewhat thickened).

Wilson's No. 3623 ("Rocks, 12,000 feet. 7/04") in the herbarium at Kew and the British Museum, belongs here—a dwarf plant with unusually broad, ovate leaves (9 × 5 mm.) only slightly glaucous below. Wilson's No. 3623a "10,750 feet. 6.04" at Kew is a taller form with longer leaves of the same breadth as the last.

Undoubtedly this species and *S. purpureoviride* are near the Himalayan *S. bupleuroides,* but that species is especially distinguished by its very broad entire glabrous leaves, which are constant in these characters. In view of the unreliability of floral features in the Rhodiolae, leaf-characters possess an added importance, and even if the differences of flower between the three prove with further material to be slight, the leaf-characters are well marked; the slender, creeping caudex of *S. discolor* besides separates it from the other two, just as the characteristic

pubescence of leaf and stem in *S. purpureoviride* divides it easily from *S. bupleuroides* and *S. discolor*.

S. dumulosum, Franchet.

Shansi : Wutaishan, Sept. 17-24, 1913. Mary Strong Clemens, No. 9063. (A tall form—stems 9 inches high—with large flowers).

There can be no doubt that *S. rariflorum*, N. E. Brown, which was described from an immature specimen (Herb. Kew) and is now in cultivation at Kew, is referable here. *S. Farreri*, W. W. Sm., also comes so close that it cannot be considered distinct. *S. dumulosum* is evidently a variable species as regards the length of the parts of the flower and the erosion of its petals, but all the specimens examined are easily referable to a well-marked general type characterised by linear leaves, congested inflorescence, linear-deltoid acute sepals, lanceolate or ovate-lanceolate acuminate flagellate erect petals, and short quadrate scales. The variations referred to as noted in the specimens examined may be shown as follows (measurements in mm.)

	Sep.	Pet.	Stam.	Carp.	Erosion of Petals
dumulosum type (ex descr).	4	8–10 × -	—	6	—
dumulosum (Fr. Hugh, in Herb. B.M., *teste* Hamet)	5	8 × 2	5	7	**Medium**
Clemens 9063 (see above)	6	11 × 3	8.5	10	Absent
rariflorum (Kew Gardens)	5	11 × 3	9	7	Slight
Farreri (type spec. Hb. Edinb).	7–8	11 × 4	7	7	**Strong**

Another variable feature is in the stems, which are sometimes mammillate near the base, sometimes smooth. The stems vary in height from 3 inches (Hugh) to 9 inches (Clemens), but this probably is due to habitat. *Farreri* is a handsome, stout form, with long sepals and broad strongly eroded petals; but in view of the variability in these respects of the examples of *dumulosum* available, it seems better not to award it varietal rank till we know more about the species.

S. Engleri, Hamet.

(1) Yunnan : Vé gué mo dja prés Pintchouan. Plante cueillie par Jean Py. 2.7.1909. F. Ducloux, No. 1612.

(2) Yunnan : On the Tong Shan in the Yangtze Bend. Lat. 27° 20′ N. Oct. 1913. Succulent plant of 6–8 inches. Flowers green. On dry rocks. Forrest, No. 11,439.

This plant was described by Hamet from incomplete specimens, wanting caudex and roots. These are present, though not in their entirety, on the two sheets referred to above, as also in the type specimen of var. *Forrestii,* Hamet, described subsequently to the species. They are puzzling and render difficult the placing of the species in any accepted section of the genus. One specimen, apparently a young plant, has a bunch of straight roots, the main one tapered, recalling those of young plants in the sections Telephium and Aizoon. But mature plants show a sinuous unbranched rootstock some inches in length and ¼ inch thick which each year produces a terminal flowering shoot, growth being continued from a lateral point at the base of this, so that the caudex forms a rough zig-zag marked with scars of old shoots about ½ inch apart. This mode of growth is not found in any section of the genus. The leaves of the plant closely resemble those of section Telephium, being flat, very broad, entire. The large very unequal sepals recall those of the Japonica series and of many Mexican species, and are very far removed from those of Telephium. In Forrest 11,489 the leaves are subopposite or subternate, not alternate as in the description. They are also described as oblong, but on both these sheets are broadly obovate, the upper ones alone approaching an oblong form. The absence of a perennial terminal bud producing scales from the axes of which flowering shoots arise keeps the plant out of section Rhodiola, which in some respects it recalls. If the above observations are confirmed by more complete material, the plant may have to be placed in a new section.

S. fastigiatum, H.f et T.

Sikkim : Dzalep La. 14,000 ft. 4.7.13. Yellow, among boulders and debris of scree. R. E. Cooper, No. 152.

S. filipes, Hemsley.

Upper Burma : Kang-fang, E. flank of Imaw-Bum Range. Lat. 28° 20′ N., long. 98° 30′ E. Alt. 6000 ft. 25.9.19. Flower pure white, stamens brick red. Growing in beds of moss in a very dark situation beneath a big boulder in the forest. A charming little plant with the leaves almost membranous. F. Kingdon Ward, No. 3690.

Well-preserved specimens in the Edinburgh herbarium, collected by E. H. Wilson in Hupeh in 1901 and 1907, and others

at Kew, show that the flowers are sometimes purple (of a lilac shade *in sicco*)—apparently more often purple than white.

S. formosanum, N. E. Br.

(1) Kwang-tung: Swatow, 180 miles N.E. of Hong Kong. 25.4.00. J. M. Dalziel.

(2) Fo-kien: Foochow, May 1897. W. R. Carles, No. 597.

Sedum horridum, Praeger, sp. nov. (Plate clxxiv, 1).

Rhodiola *S. nobili*, Franch. et *S. Smithi*, Hamet, ex descript. affinis. Ab *S. nobili* caulibus pedicellisque foliisque scabridis (nec glabris), inflorescentia 4–8-flora (nec uniflora), caulibus vetustis inferioribus erectis (nec patulis), petalis 3 mm. (nec 6 mm.) longis etc. differt. Ab *S. Smithi* caulibus etc. scabridis (nec glabris) robustis (nec gracilibus), sepalis petalisque angustioribus, etc. distinguitur.

Herba perennis scabrida, caules steriles non edens. *Caudex* erectus, crassus, simplex, nisi basi caulibus emarcidis vetustis imbricatis squamisque longe deltoideis 5 mm. longis dense obtectus, apice caules floriferos ex squamarum longe deltoidearum axillis ferens. *Caules* multi, erecti, simplices, dense foliosi, scabridi, circiter 4 cm. longi. *Folia* oblongo-lanceolata ad oblongo-ovata, obtusa, sessilia, crassa, supra subtusque papillosa, 6–9 mm. longa, 2–2.5 mm. lata. *Inflorescentia* densa, 4–8-flora, bracteata; bracteae foliis similes sed minores; pedicelli .5 mm. longi. *Flores* 4-meri, dioici, 4 mm. longi. *Flos* ♂: *Sepala* oblongo-ovata vel oblongo-lanceolata, semiteretia, obtusa, 2.5–3 mm. longa, .75–1.0 mm. lata. *Petala* erecta, ovata vel ovato-rhomboidea, obtusa, 3 mm. longa, 1.75 mm. lata, parte connata .5 mm. longa. *Stamina* 8, 3.25 mm. longa, epipetala fere ad basim inserta, filamenta longissime deltoidea. *Squamae nectariferae* subquadratae, apice retusae, .3 mm. longae, .5 mm. latae. *Carpella* abortiva, .75 mm. longa.

W. Yunnan: Mossy, stony, shady situations in pine forests on the eastern flank of the Tali Range. Lat. 25° 40′ N. Alt. 12,000–13,000 ft. Oct. 1906. Erect plant of 3–9 inches. Flowers green, anthers brown. G. Forrest, No. 5055. (Published as *S. nobile*, Franch., *vel aff.* in Notes R.B.G. Edinb. vii, 293).

From the few other Rhodiolas characterised by general scabridity it is easily distinguished. *S. scabridum*, Franch. has acuminate mucronate (not blunt) leaves, acuminate (not blunt) sepals, lanceolate acute (not ovate blunt) petals and a much shorter slender caudex. *S. Bouvieri*, Hamet has ovate acute (not linear-lanceolate blunt) leaves, erose (not entire) petals, etc. *S.*

himalense, Don and *S. purpureoviride*, Praeger are tall stemmed plants, not at all near to the present species, and *S. Durisi* is likewise far removed, having a short caudex and a basal rosette of leaves.

S. humile, H.f. et T.

E. Himalaya : Chakalung La, 16,000 ft. 12.9.12. Sedum sp. Coll. Rohmoo Lepcha, No. 314.

S. indicum, Hamet.

The type is a common plant in Yunnan and E. Tibet.

var. **densirosulatum**, Praeger.

(1) Yunnan : Sedum vivace, feuilles de la base imbriquées. Fl. rouges. Toitures, vieux murs, plaine de Tong-tch'ouan. Alt. 2500 m. Novembre. E. E. Maire, No. 232/1914.

(2) Yunnan : Dry situations amongst rocks on the divide between the Hoching and Lichiang Valleys. Lat. 26° 40′ N. Alt. 8000 feet. Nov. 1910. Plant of 3–6 inches. Flowers greenish-purple. In seed. G. Forrest, No. 7351.

(3) Yunnan : Lichiang Range. Lat. 27° 30′ N. Alt. 10,000 feet. Sept. 1918. Succulent plant of 1–3 inches. All parts dull dark crimson. On rocks and stony dry pasture. G. Forrest, No. 17,099.

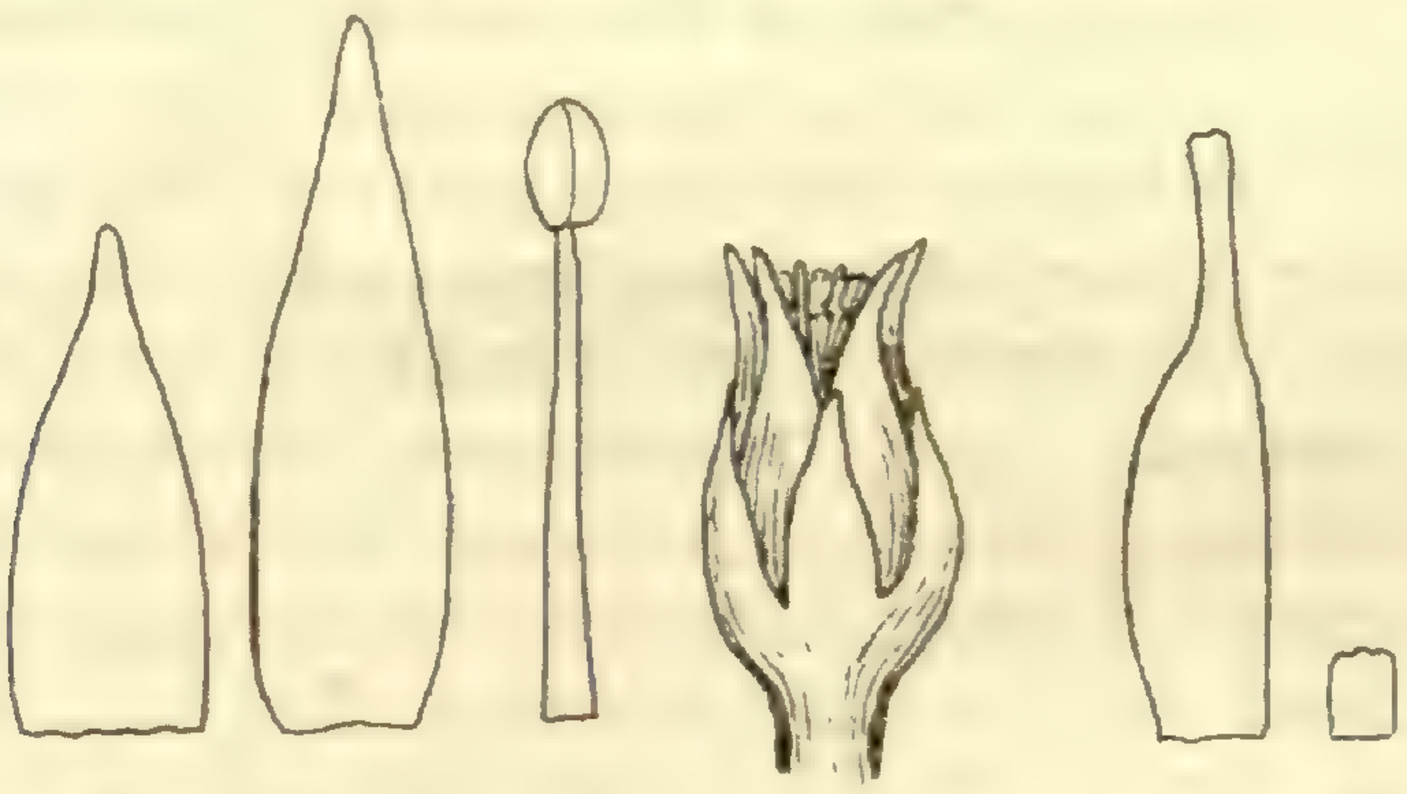
var. **luteorubrum**, Praeger, var. nov. (text figure).

Flores quam in typo majores, *sepalis* deltoideo-lanceolatis acuminatis 4 mm. longis, 1.5 mm. latis, *petalis* lanceolatis acuminatis 5–5.5 mm. longis, 1.5 mm. latis, *staminibus* 5, 4.5 mm. longis, *squamis nectariferis* quadratis emarginatis .75 mm. longis, .6 mm. latis, *carpellis* cum stylis longis linearibus 3–4.5 mm. longis.

Yunnan : Mekong-Salwin divide. Lat. 28° 10′ N. Alt. 11,000 feet. Plant of 4–7 inches. Stems and calices red. Corolla pale yellow tipped red. Anthers yellow. Open dry situations amongst rocks and boulders. Aug. 1914. G. Forrest, No. 13,377.

It is with some hesitation that this plant is set down as a variety of *S. indicum*, and not as a species, and if leaves were present they might show that the plant is quite distinct. But the presence of only 5 stamens, and the peculiar shape of the stamens and carpels are characteristic of *indicum*, the sepals and petals of which are variable in shape and relative length. The characteristic thickening on the face of the petal of *indicum* unfortunately

cannot be detected in the dried plant. The stems, pedicels, back and edges of the sepals, and tips of the petals are finely and shortly papillose, a character which I have only once seen (Herb. Edinb.) on *S. indicum,* which is typically glabrous; it is quite different from the hairiness of var. *yunnanense*. The erect stem is unbranched save quite at the top, giving the inflorescence (which is about 1½ inch long and 2 inches broad) an umbellate appearance (different from normal *indicum*). A few of the uppermost bracts remaining resemble the sepals, and are sessile, lanceolate and acuminate (those of *indicum* are usually stalked and oblanceolate or oblong). The flowers are yellow, much flushed with red, and are 6 mm. long—much longer than in typical *indicum,* but there is one plant in Herb. Edinb. with flowers as large. The long, straight, erect petals make the outline of the flower oblong, different from the sub-orbicular shape given by the incurved petals of *indicum*. The stem shows scars of 20 to 30 leaves, the scars being crowded at the base as in *indicum,* but showing none of the thickening usually seen in *indicum* as the result of its first year rosette stage.



Sedum indicum, Hamet, var. *luteorubrum*, Fraeger. a, flower x 3; b, sepal, c, petal, d, stamen, e, carpel, f, scale, all x 6.

var. yunnanense, Hamet.

Yunnan : Sedum vivace, feuilles de la base imbriquées. Fl. rouges. Toitures, vieux murs, plaine de Tong-tch'ouan. Alt. 2500 m. Novembre. E. E. Maire, No. 232/1914.

S. Kirilowii, Regel.

(1) Himalaya : Ridge above Changu, Sikkim. Alt. 13,000 feet. 28.6.13. In peat and moss-grown boulders. R. E. Cooper, No. 53.

(2) S.E. Tibet : Forest, 14,000 feet. Ka-gwr-pw. July 21, 1913. F. Kingdon Ward, No. 848.

An additional station from the Kew Herbarium may be added :—

(3) Himalaya : Chongra, one day N.W. of Chumbi. 7 July 1878. Coll. Dungboo. Flowers white or red.

S. Leblancae, Hamet.

(1) Yunnan : Sedum annuel. Fl. jaunes. Rochers des collines à Tong-tch'ouan, alt. 2550 m. Novembre. E. E. Maire. Nos. 228/1914, 231/1914.

(2) W. Szechuan—10.08. E. H. Wilson, No. 2499. (A sheet of the same gathering is in the Kew Herbarium[1].

S. Leveilleanum, Hamet. (Plate clxxii, 1).

In describing this remarkable Sedum (Bull. Soc. Bot. France, lv (1908), 712), which comes from the Island of Quelpaert (Faurie Nos. 136, 623, 1795, 1500–1700 mètres) M. Hamet linked it with *S. primuloides,* Franch. from Yunnan and *S. pachyclados,* Aitch. and Hemsl. from Tibet. I have endeavoured to show (Trans. Bot. Soc. Edinb. xxvii (1917), 107), that these three species belong to a primitive group of the section Rhodiola, and have placed them in a new series Primuloides of that large section of Sedum. The peculiar characters which link the species of this group with the typical Rhodiolas, from which they differ much in appearance, are the thickened rhizome bearing at its summit a tuft of leaves with broad clasping bases (the scales of the more typical Rhodiolas), from the axils of which spring the leafy flowering-stems. *S. pachyclados* has been figured already (Aitchison and Hemsley, Journ. Linn. Soc. Bot. xix, pl. 10) also *S. primuloides* and *S. Praegerianum* (Praeger, *l.c.*) and *S. Balfouri* (*supra* v, pl. lxxxv). In the present paper a new member of the group, *S. Barnesianum,* is figured. I am glad to be able to add a figure of *S. Leveilleanum.* Two good sheets of the plant are in the British Museum (Faurie Nos. 623 and 1795), labelled in Hamet's writing, by a strange inadvertence, *S. sikokianum,* Hamet (*sic!*); the figure is taken from a specimen on the latter sheet, by kind permission of Dr Rendle.

Writing to me in 1919, M. Hamet put forward a different view as to the affinities of *S. Leveilleanum.* "Le *S. Leveilleanum,*" he says, "contrairement a mon opinion primitive, ne peut être rapproché des *S. primuloides* et *pachyclados.* Il trouve sa place au voisinage du *S. spinosum.*" It is difficult to find grounds for this opinion. Pending publication of the reasons for it, discussion is premature, but the case for M. Hamet's original opinion, in which I fully concur, is undoubtedly strengthened by the discovery of the allied *S. Barnesianum,* described on a preceding page.

M. Hamet's description is full, and little can be added to it. It is important to note that the caudex-leaves have the broad clasping base characteristic of Rhodiola, a critical point, to my mind of high diagnostic value, not previously mentioned. The leaves when dry are white at the tip, recalling those of *S. limuloides*, Praeger and *S. spinosum*, Thunberg. The petals are erect, concave, minutely beaded on the mid-rib, hooded at the apex, with a minute mucro behind and exceeding the tip. From the trace of colour remaining, they appear to be reddish. The carpels and scales in the specimen examined are considerably smaller than described by Hamet (carpels 1.5 mm. long instead of 2.75, scales .5 mm. long instead of .75), and as I suspect that they are abnormal I have not figured them.

In comparing the figure with that of *S. primuloides* (*l.c.*) it should be borne in mind that the latter is from a garden-grown plant. Collected specimens of *S. primuloides* are as dwarf and congested as in the figure of *S. Leveilleanum*, rendering the two very similar in appearance.

S. lineare, Thunb.

(1) Kwang-tung : Thai-yong, 60 miles W. of Swatow, July 1901. J. M. Dalziel.
(2) Kiangsi : Kew-Kiang Hills. 22.5.92. Sedum sp. Yellow. W. R. Carles, No. 175.

Sedum longistylum, Praeger, sp. nov. (Plate clxxv, 2).

Species annua (vel biennis), inflorescentiis parvis ad apices ramorum longorum simplicium congestis, petalis oblongo-ovatis acuminatis purpureis, staminibus quinque, carpellis stylis longis coronatis distinguenda.

Herba annua (vel biennis), glabra, 20–25 cm. alta. *Caulis* erectus, ramosus, ramis longis (ad 20 cm.) divergentibus simplicibus floriferis. *Folia* alterna. *Inflorescentia* congesta, pseudo-umbellata, 1.0 cm. longa, 1.5 cm. lata, pedicellis quam flores brevioribus, bracteis paucis integris planis ovatis sessilibus breviter acuminatis 2–3 mm. longis. *Flores* 10–20 (in quaque inflorescentia) purpurascentes. *Calyx* 3.5 mm. longus; pars concreta 1.25 mm. longa; pars libera segmentis inaequalibus 5 oblongo-deltoideis obtusis viridibus 1.5–2.5 mm. longis, 1–1.25 mm. basi latis. *Petala* 5, oblongo-deltoidea acuta vel oblongo-ovata acuminata, 3.5–4.0 mm. longa, basi 1.25 mm. lata, parte superiore purpurea. *Stamina* 5, episepala, 3 mm. longa, filamentis longissime deltoideis, antheris aureis. *Squamae nectariferae* minutae, emarginatae, paullo latiores quam longiores, .75

mm. latae. *Carpella* 5, erecta, 3 mm. longa, stylis gracilibus erectis 1.25 mm. longis.

W. China: Fl. dark chocolate. Rocks, 4000 ft. 7.03. E. H. Wilson, No. 3640.

The only specimen, which is in the Kew Herbarium, is poor, all leaves having been lost, and the roots are wanting, but its habit and small dense inflorescences of purple flowers, possessing only 5 stamens, distinguish it from any other described Sedum. To judge from the few bracts, the leaves are broad and entire.

Sedum macrocarpum, Praeger, sp. nov. (Plate clxxvi).

Sedo Kirilowii, Regel, propinquum, sed carpellis floris feminini insignibus, caule et inflorescentia papillosis (nec glabris), foliis plerumque subverticillatis (nec alternis) differt.

Planta perennis. *Caudex* crassus, apice squamas longe deltoideas acutas circiter 4 mm. longas et caules floriferos ferens. *Caules* pauci, annui, erecti, simplices, foliosi, 10–30 cm. longi, in parte superiore minute papillosi. *Folia* subverticillata vel alterna, plana, sessilia, glabra, acuta; infima minima lanceolata integra; superiora lineari-oblanceolata, acute et irregulariter dentata, 2–4 cm. longa, ad 1 cm. lata. *Inflorescentia* cymosa, satis laxa, 2–4 cm. longa, 3–7 cm. lata, bracteata; bracteae inferiores foliis similes et aequilongae, inflorescentiam multo superantes; bracteae superiores minores, marginibus in parte superiore dentatis in parte inferiore papillosis; inflorescentiae rami papillosi; pedicelli papillosi, floribus plerumque breviores. *Flores* 5-meri, dioici. *Flos* ♀ : *sepala* et *petala* linearia, obtusa, flava,; *sepala* 5 mm. longa, *petala* 6 mm. longa; *squamae nectariferae* quadratae, emarginatae, 1 mm. longae et latae, purpureae; *carpella* ampla robusta, cum stylis 10 mm. longa, purpurascentia; styli breves, recti, divergentes, stigmatibus capitellatis. *Flos* ♂ : *sepala* et *petala* linearia, obtusa, suberecta, flava vel rubescentia, *sepala* 4–4.5 mm. longa, *petala* 5–5.5 mm. longa; *stamina* 10, erecta, 8 mm. longa, flava; *squamae nectariferae* quadratae, 1 mm. longae et latae, carneae; *carpella* lineari-lanceolata, 5 mm. longa, vacua.

(1) Upper Burma: Chimili. Alt. 12,000 feet. Aug. 1, 1919. Sedum sp. Common in stony places and stone slides of the high-alpine region. R. Farrer, No. 1168. (♂)

(2) Upper Burma: Imaw Bum. Alt. 12,000 feet. Lat. 26° 10′ N. Long. 98° 30′ E. 27.7.19. Sedum. Flowers very pale yellow, almost colourless, fruits bright red. Forms small clumps, or single plants, on sheltered boulder screes, surrounded by bamboos, etc. Protected east slope. F. Kingdon Ward, No. 3412 (♀ and ♂).

An additional station from the Kew Herbarium may be added :—

(3) West Szechuan, 6.08. E. H. Wilson, No. 2527. (These specimens are less extreme, and approach *S. Kirilowii* in their alternate leaves, diminished papillosity and less exuberant bracts).

S. mekongense, Praeger, sp. nov. (Plate clxxvii, 1).

Planta habitu *S. Alfredi,* Hance. *S. Pampanimii,* Hamet propinqua, sed caulibus multo longioribus (ad 20 cm. nec 4–5.5 cm.) basi et medio (nec basi solum) ramosis, foliis majoribus 8–9 mm. (nec 3.8–6 mm.) longis 1.5 2 mm. (nec .6–1.0 mm.) latis, petalis brevioribus 4.5 mm. (nec 6–9.5 mm.) longis, staminibus brevioribus 2.5 mm. (nec 5–6.5 mm.) longis, carpellis brevioribus 2.5 mm. (nec 5.5 mm.) longis distinguenda.

Herba glabra, perennis. *Radices* fibratae. *Caudex* nullus. *Caules* multi, ramosi, ad 20 cm. longi, parte inferiore subrepentes et radicantes, parte superiore adscendentes, foliosi. *Folia* alterna, oblongo-linearia vel lineari-lanceolata vel ovato-lanceolata, plana (?), sessilia, 8–9 mm. longa, 1.5–2 mm. lata, apice acuta, mucronata, basi calcarata; calcar integrum, obtusum. *Inflorescentia* terminalis, 3–8-flora, 1–2 cm. lata, e flore terminali et ramis duobus patentibus 2–3-floris plerumque composita; bracteae foliis similes sed minores. *Flores* sessiles vel subsessiles, lutei, 5-meri. *Sepala* libera, inaequalia, longe deltoidea vel oblonga, obtusa vel apiculata, 3–4.5 mm. longa. *Petala* libera, lanceolata, obtusa vel subacuta, 4.5 mm. longa, 1.5 mm. lata, nervo in mucronem apicem superantem producto; mucro .5 mm. longus. *Stamina* 10, epipetala basi inserta, filamentis filiformibus 2–2.5 mm. longis, antheris ovatis .5 mm. longis. *Squamae nectariferae* minutae, quadratae, retusae, .4 mm. longae et latae. *Carpella* cum stylis 2.5 mm. longa; styli longi recti graciles, 1 mm. longi.

Yunnan : Mekong Valley. Lat. 28° 20′ N. Alt. 6000 feet. June 1917. Plant of 6–10 inches. Flowers yellow. On dry rocks. G. Forrest, No. 14,537.

It is with some regret that one adds another to the many species of the Japonica group which have narrow pointed leaves, but the present plant appears quite distinct from any of those previously described. It produces a grove of annual ascending stems from a decumbent base, after the manner of *S. Alfredi* or the American *S. mexicanum.* The material is poor, all the leaves having dropped off, but a figure of a shoot is given restored as far as possible.

S. Oreades, Hamet.

(1) Yunnan : Tali Range. Lat. 25° 40′ N. Alt. 12,000 feet. Aug. 1913. Plant of 2 inches. Flowers bright golden-yellow. On ledges of cliffs and humus-covered boulders. G. Forrest, No. 11,706.

(2) Yunnan : Mountains east of Chungtien. Lat. 27° 50′ N. Alt. 14,000 feet. Plant of 2–5 inches. Flowers brassy-yellow. Open, moist, stony pasture and on rocks and boulders. Aug. 1917. G. Forrest, No. 15,118.

(3) S.E. Tibet : On Ka-gwr-pw, Mekong-Salwin divide. Lat. 28° 30′ N. Alt. 13,000 feet. Aug. 1917. Plant of 2–4 inches. Flowers golden yellow. On open cliffs and boulders. G. Forrest, No. 14,620.

This is *Cotyledon Oreades,* C. B. Clarke, (*Umbilicus Oreades,* Decne.) so placed on account of its 5 stamens and connate petals, which are conjoined for a length of 3 mm. As a matter of fact the number of the stamens is quite irregular. In Nos. F. 14,620 and F. 15,118 there are 10, all fully developed, the epipetalous ones 5 mm. long (1 mm. shorter than the others), and adnate for half their length. In F. 11,706 and Wilson 1191 the 5 epipetalous stamens are shrunken and abortive. In other gatherings (F. 6511, F. 7212) we get, for instance, 1 or 2 abortive epipetalous stamens, or 6 petals, 3 of them with abortive stamens. In none are epipetalous stamens wholly absent.

The two first-mentioned plants, with 10 functioning stamens, belong to a large race with up to 20 flower stems 4 to 5 inches high, and inflorescences with up to 7 (not 1–3) golden (not white) flowers.

The 10-stamened form is excellently figured by Decaisne in Jacquemont's "Voyage," Atlas, ii, pl. 73, fig. 2, as *Umbilicus luteus,* a name altered in the letterpress of the same work (iv, 62) to *U. Oreades;* there the stamens are stated to be five and the flowers yellow.

S. orichalcum, W.W. Sm. (Plate clxxvii, 2).

I am glad to have an opportunity of figuring this very interesting species, and of correcting an error regarding its leaves. The leaves of the rosette were described* as "basi rotundata," and in discussing the plant I referred to them as "narrowed at the base and joined to the caudex in the usual Sedum manner by a very constricted attachment."† A fuller examination of the type shows that this statement was founded on an imperfect leaf. The root-leaves are joined to the caudex by a broad clasp-

* Notes R. Bot. Gard. Edinb. ix, 125.
† Proc. R. Irish Acad. xxxv B, 4, 1919.

ing base exactly as in the Primuloides group of Rhodiola, to which the plant also conforms in its axillary flower-stems. It appears to be close to *S. Balfouri,* with which it agrees in its Sempervivum-like leaf rosette, cymose inflorescence with arcuate branches and linear nectariferous glands (the last feature very unusual save in the Telephium section); I think it should be placed next to that species (of which a figure will be found in Notes R. Bot. Gard. Edinb. v, pl. lxxxv).

S. Praegerianum, W.W. Sm.

Tibet: Chumbi, 28.8.13. R. E. Cooper, No. 711. (The Chumbi Valley is the locality where the species was originally obtained by a native collector).

S. primuloides, Franchet.

Yunnan: Oct. 1913. G. Forrest, No. 11,451.

S. pseudospectabile, Praeger.

Corea: (1) Chemulpo, in petrosis collium. Sept. 1906. U. Faurie, No. 624. (2) Chinnampo. Sept. 1901. U. Faurie, No. 282.

Sedum pseudostapfii, Praeger, sp. nov. (Plate clxxiv, 2).

Sedo Stapfii, Hamet subsimilis, sed statura duplo majore, verticelli foliis biformibus latioribus, pedicellis 1–3 (nec 5–10) mm. longis, inflorescentia bracteata (nec nuda), petalis oblongo-lanceolatis (nec obovatis vel suborbicularibus) integris (nec marginibus erosis) differt.

Planta perennis, glabra. *Radices* fibratae. *Caudex* gracilis, repens (?), apice caulem sterilem brevem vel caulem floriferum emittens. *Caulis* sterilis brevissimus, gracilis, sparsim foliosus; caulis floriferus erectus, simplex, 4–5 cm. longus, infra nudus, supra medium foliorum verticellum, apice inflorescentiam, ferens. *Folia* rami sterilis 2- aut 4-verticillata biformia, alia majora, alia minora; folia majora petiolata; petiolus ad 5 mm. longus; lamina plana, integra, late obovata vel ovato-rhomboidea, 2 cm. longa, 1.5 cm. lata, apice abrupte apiculata, basi cuneata; folia minora plana, integra, spathulata, apice obtusa, circa 5–8 mm. longa. Folia rami floriferi 4-verticellata, in verticellum unicum disposita, duo majora, alterna minora; folia majora plana, integra, petiolata; petiolus 3–5 mm. longus; lamina late obovata vel ovato-rhomboidea apice abrupte apiculata, 2.0 cm. longa, 1.5 cm. lata; folia minora breviter petiolata, apice obtusa; lamina 1.0 cm. longa, .7 cm. lata. *In-*

florescentia cymoso-paniculata, circiter 15 mm. longa et lata, e ramis 4–5 composita; rami bracteati; bracteae obovatae, obtusae, sessiles, circiter 4 mm. longae, 3 mm. latae. *Flores* 5-meri, albi, minuti, pedicellis brevissimis. *Calyx* 2 mm. longus, rubro-punctatus, segmentis ovato-oblongis obtusissimis 1.5 mm. longis basi 1.0 mm. latis. *Petala* late oblongo-lanceolata, obtusa, 2–2.5 mm. longa, .75 mm. lata, apice cucullata. *Stamina* 10, 1.75–2 mm. longa, epipetala parum adnata, filamentis linearibus, antheris reniformibus. *Gynaecium* late ovatum, carpellis 2 mm. longis erectis, stylis brevibus erectis. *Squamae nectariferae* minutissimae.

Sikkim: Lachen and Cheungtong. Alt. 8000 feet. 9.8.13. "Succulent small white, among moss, etc." R. E. Cooper, No. 440.

A very peculiar little plant, of which further material would be desirable; it is difficult to point to any species to which it has affinities. To judge from the number of leaf-scars the short barren shoot lasts for more than one year before lengthening into a flowering shoot with its single verticel of unequal leaves. It comes nearest to *S. Stapfii*, Hamet, which is figured from the type for comparison (Plate clxxiv, 3).

S. purpureoviride, Praeger.

This species is well represented in the Edinburgh Herbarium.

(1) S.E. Tibet: On the Ka-gwr-pw, Mekong-Salwin divide. Lat. 28° 25′ N. Alt. 13,000 feet. Aug. 1917. Plant of 2 feet. Flowers yellow. Open stony pasture and on ledges of cliffs. Forrest, No. 14,512. (This plant is less pilose than is usual).

(2) Yunnan: Forrest, No. 2610 (*supra* vii, p. 146, where Diels records it as *S. roseum*, Scop., var. (?)).

(3), (4) Forrest, Nos. 6065, 6135 (*supra* viii, p. 141, where Hamet records them as *S. roseum*, Scop., var.).

(5) Tsekou, July. Monbeig. 83/112.

(6), (7), (8) Monbeig, No. 115; Monbeig (no number); Ward, No. 744. (For particulars see Journ. of Bot., lv (1917), p. 40).

Note:—A plant at Kew and the British Museum collected by A. E. Pratt in West Szechuan (No. 547) is a vigorous form of this species with leaves much broader and more oblong than in type and (especially the British Museum specimens) resembling *S. Fabaria* in shape and dentition of leaves.

S. Rendlei, Hamet.

Described ("Kew Bulletin," 1913, 157) as having caudex creeping, suberect at the apex; stems glabrous, petals very broadly linear. The type is at the British Museum, and a co-type at Kew. In these the pedicels and upper part of the stem

are papillose, and the petals would be better described as ovate-lanceolate. As regards the caudex, while in the British Museum specimens this appears to have been creeping, in the Kew plants it was clearly erect.

Sedum robustum, Praeger, sp. nov. (Plate clxxviii).

Species *S. roseo,* Scopoli et affinibus consanguinea, sed foliis linearibus integris *S. algido,* Ledeb. similior, a *S. roseo* aliisque distans. A *S. algido* caulibus robustis et foliis majoribus differt. A *S. roseo* et affinibus, quoque *S. algido,* sepalis quam petala longioribus, staminibus brevissimis, etc. valde differt.

Herba dioica, perennis, robusta, glabra. *Caudex* erectus, elongatus, crassus, 2–2.5 cm. diametro, infra nudus vel caulibus vetustis paucis paleaceis praeditus, apice squamas ovatas vel lanceolatas erectas acutas brunneas et caules floriferos emittens. *Caules* pauci, erecti, robusti, glabri, simplices, 15–20 cm. alti, 5–8 cm. diametro, foliosissimi a basi ad apicem. *Folia* integra, plana, late linearia, apice obtusa, apice et basi angustata, 30 mm. longa, 4 mm. lata. *Inflorescentia* terminalis, densa, 3 cm. diametro, foliosissima. *Flores* 5-meri, campanulati. *Flos* ♂: *Sepala* linearia obtusa, 4 mm. longa, .5 mm. lata, purpurea vel apice purpurea. *Petala* oblongo-lanceolata, obtusa, libera, 3 mm. longa, 1 mm. lata. *Stamina* 10, epipetala prope ad basim inserta, 2 mm. longa; episepala 2.5 mm. longa. *Squamae nectariferae* minutae, ovatae. *Carpella* minutissima, 1 mm. longa.

(1) S.E. Tibet: Moist, open pasture on the Mekong-Salwin divide, Mekong Valley. Lat. 28° N. Alt. 12,000 feet. Sept. 1904. Plant of 6–12 inches. Flowers green. G. Forrest, No. 5088.

(2) N.W. Yunnan: Moist, rocky pasture on the Kari Pass, Yangtze-Mekong divide. Lat. 28° N. Alt. 12,000–14,000 feet. Sept. 1904. Plant of 6–10 inches. Flowers green. G. Forrest, No. 5087.

These two plants are recorded as "*S. roseum,* Scop. vel aff."; *supra,* vii, p. 297.

A third locality may be added from the Kew Herbarium:—

Yunnan: Tsekou. Coll. by Père T. Monbeig.

The weak development of the caudex-scales points to affinities with the *roseum* group of Rhodiola. The plant is apparently not so variable as many of the Rhodiolas, the three gatherings being very closely similar. It appears to be of much softer texture than most of its allies, the stems becoming quite thin and flat in drying, not twig-like, and the leaves being obviously limp.

The exceedingly short stamens are found in all three gatherings, and are apparently normal, but the filaments have not altogether the appearance of being properly developed, and are

possibly dwarfed. I have seen similar stunted stamens in flowers of *S. proponticum* and *S. Someni,* due in the first case to weakness caused by attacks of green-fly, and in the second to immaturity of the plant. Such short stamens are very exceptional in Rhodiola.

S. roseum, Scop. var. **atropurpureum,** Turcz.

(1) N.W. Yunnan : On rocks, 13,000 ft. A-tun-tsu, 27.6.13. F. Kingdon Ward, No. 564 (in part). A beautiful little plant, with very glaucous leaves and dark purple flowers.

(2) Yunnan : Rocks, etc., 14,500 ft. A-tun-tsu, 7.8.13. F. Kingdon Ward, No. 985.

S. rotundatum, Hemsley.

(1) E. Himalaya : Kalaeree, 16,000 ft. 12.9.12. Sedum sp. Col. Rohmoo Lepcha, No. 435.

(2) S.E. Tibet : Sarong. Alt. 12,000 ft. On Doker-la, Mekong-Salwin divide. Lat. 28° 20′ N. Bunched plant of 3–5 inches. Flowers bright red-crimson. Open ledges of cliffs and humus-covered boulders. Aug. 1917. G. Forrest, No. 14,707.

(3) E. Tibet : Doker-la. Sedum. Forming big cushions among boulders, 16,000 ft. 13.7.13. F. Kingdon Ward, No. 764.

(4) N.W. Yunnan : A-tun-tsu. July. Fleshy leaves. Screes of boulders. 1911. F. Kingdon Ward, No. 36.

(5) N.W. Yunnan : Mountains of the Chungtien Plateau. Lat. 27° 30′ N. Alt. 13,000 ft. July 1914. Succulent plant of 6–8 inches. Flowers crimson. Open ledges of cliffs and on stony pasture. G. Forrest, No. 12,833.

Two additional stations for this striking plant may be added from the Kew Herbarium :—

(6) W. China : Fl. yellow. Bare rocks and stony places. Alt. 12,000–14,000 ft. 9.04. E. H. Wilson, No. 3628.

(7) Sikkim : Thanka-la. Alt. 16,000 ft. 25 Nov. 1911. (As *Sedum crenulatum*). Coll. Ribu and Rohmoo, No. 5803.

S. scabridum, Franchet.

(1) Himalaya : Above Dakwani, about 12,000 ft. 8.9.85. Presented by J. R. Reid (as *S. asiaticum,* DC.)

(2) Himalaya : Height above Chahlek, Byans, about 12,000 ft. July 23, 1886. Presented by J. R. Reid (as *S. asiaticum,* DC.)

S. Someni, Hamet.

(1) Yunnan: Sedum annuel. Fl. jaunes. Toitures et roches au pied des mont à Tong-tch'ouan, alt. 2500 m. Octobre. E. E. Maire, No. 609/1913.

(2) Yunnan: Sedum annuel. Feuilles en rosette. Fl. jaunes en ombelle. Toitures, vieux murs, rochers. Plaine de Tong-tch'ouan, alt. 2500 m. Octobre E. E. Maire, No. 437/1914.

(3) Yunnan: Sedum annuel. Fl. verdâtres. Toitures de Tong-tch'ouan, alt. 2500 m. Novembre. E. E. Maire.

The plant would appear to be biennial, possibly sometimes annual.

Sedum trientaloides, Praeger, sp. nov. (Plate clxxv, 1).

Species insignis, fragilis, gracilis, perennis, foliis latis integris petiolatis inferioribus oppositis mediis 4-verticillatis superioribus minutissimis, inflorescentia laxa pauciflora, floribus albis, pedicellis longis filiformibus distinguenda.

Herba perennis, glabra, fragilis. *Radices* fibratae, graciles, elongatae. *Rami steriles* nulli? *Rami floriferi* annui, erecti vel adscendentes, gracillimi, simplices vel prope basim ramosi, 4–8 cm. alti, foliosi, internodiis irregularibus, .5–3 cm. longis, saepissime circa 2 cm. longis. *Folia* plana, integra, rubro-punctata, ad medium vel supra medium caulis 4-verticellata; verticelli folia duo opposita majora, duo opposita minora; folia majora verticelli petiolata vel subpetiolata; petiolus linearis vel cuneatus 2–5 mm. longus; lamina obovata vel orbicularis, vel rhomboideo-orbicularis, apice rotundata vel obtusissima, basi cuneata, 6–12 mm. longa, 6–12 mm. lata; folia minora verticelli petiolata vel subpetiolata; petiolus 2–3 mm. longus; lamina obovata vel spathulata, apice rotundata, 4–8 mm. longa, 3–5 mm. lata. Folia infraverticillaria majoribus verticelli consimilia sed minora, 2 vel 4 vel 6, opposita. Folia supraverticillaria 2–4, minuta, opposita vel alterna, sessilia, ovata vel obovata vel oblonga, obtusa, 2–4 mm. longa, sursum in bracteas minutas decrescentia. *Inflorescentia* 1–6-flora, paniculata, laxa, bracteis minutis oblongis vel linearibus sessilibus, pedicellis filiformibus 4–5 mm. longis. *Flores* hermaphroditi, 5-meri, albi, rubropunctati. *Calycis segmenta* oblonga, obtusa, brevissime connata, 1.5 mm. longa, .6 mm. lata, viridia, rubropunctata. *Petala* ovata, apice attenuata, acuta, 3.5 mm. longa, 1.5 mm. lata, alba, rubropunctata, mucronem minutum post apicem ferentia. *Stamina* 10; epipetalorum pars libera 1.5–2 mm. longa, pars concreta 1 mm. longa; antherae aureae. *Squamae nectariferae* cuneatae, ob-

longae, .5 mm. longae, .25 mm. latae. *Carpella* erecta, in stylos breves attenuata, 3 mm longa, rubrolineata.

Upper Burma : Hpimaw Limestone Peak, on wet moss-covered boulders in shade, 9000–10,000 ft. Flowers whitish-pink. 9.7.14. F. Kingdon Ward, No. 1770.

A very distinct little plant of tenuous texture when dried. Although several other Asiatic species agree with it in its peculiar character of a marked verticel of leaves about midway on the stem, with or without other leaves above or below (e.g. *S. Stapfii,* Hamet, *S. pseudostapfii,* Praeger (*supra* p. 91), *S. Levii,* Hamet, *S. Bonnafousi,* Hamet) none of these have any affinity with it, and it is difficult to suggest to what species or group of species it is most nearly related. The broad entire opposite stalked leaves, long filiform pedicels, and small white flowers suggest the section Cepaea, but the perennial duration and especially the very few-flowered inflorescences will not fit that group. Barren stems are apparently absent, annual flowering stems arising from the lowest leaf-axils of the previous year's stems, as in *S. Alfredi* and some of the Mexican species. All its characters of root, leaf and stem point to its being a plant of damp shady places, as is borne out by the label. Named from its recalling in appearance *Trientalis europaea,* Linn.

S. trifidum, Wallich.

(1) N.W. Yunnan : Pei-ma-Shan, 14–15,000 ft. Dry rocks. 1913. F. Kingdon Ward. No. 1090.

(2) Yunnan : Crassulacée vivace. Rochers de haute plateau de Ie-ma-tch'ouan. Alt. 3200 m. Août. E. E. Maire, No. 1052/1913.

(3) Yunnan : Mountains of the Chungtien Plateau. Lat. 27° 30′ N. Alt. 11,000 ft. Plant of 1–2 inches, flowers pale yellow. On rocks and humus-covered boulders. July 1914. G. Forrest, No. 12,757.

(4) Yunnan : Yung-peh Mountains. Lat. 26° 42′ N. Alt. 8000 ft. Succulent plant of 3–6 inches. Flowers yellowish-white. On rocks and dry stony pasture. Sept. 1918. G. Forrest, No. 16,911.

These all represent the same plant or plants which M. Hamet (*supra* v, 119) named *S. trifidum,* vars. *Balfouri* and *Forresti,* but later (*supra* viii, 140, 142) placed as varieties of *S. linearifolium,* Royle. He does not state his reasons for this change of species, and the varieties are based mainly on the shape of the sepals. In the Himalayan *trifidum* the sepals are very inconstant in shape, varying from small triangular $^1/_5$ as long as the petals to long, linear, equalling the petals; the sepals of *trifidum*

appear to offer no characters to distinguish that species from *linearifolium*. The petals of *trifidum* are variable also though to a less extent, and are usually, but not always, narrower than those of *linearifolium*. Much the best character by which to separate the two species is the leaves, which in *trifidum* are aggregated at or near the top of the stem, and though very variable in shape are generally very much broader and more deeply toothed than those of *linearifolium*, in which they are scattered along the stem, linear or nearly so, and entire or slightly toothed. On this showing, Hamet's two varieties ought to remain under *trifidum;* they have the leaves of that species, the sepals are untrustworthy, and the petals in specimens named by him are in some cases as narrow. The two varieties besides seem rather close together for so variable a plant.

S. variicolor, Praeger.

(1) Yunnan : Sedum annuel. Fl. jaunes d'ocre. Toitures de Tong-tch'ouan. Alt. 2500 m. Novembre. E. E. Maire.

(2) Yunnan : Sedum vivace. Fleurs et tiges jaunes. Rochers au pied des montagnes à Tong-tch'ouan. Alt. 2500 m. Octobre. E. E. Maire. No. 1150/1913.

(3) Yunnan, 1913. E. E. Maire, No. 563/1913.

Hamet in Herb. Léveillé (now in Herb. Edinburgh) names several sheets of this plant *S. leucocarpum*, Franch. But I cannot make *S. variicolor* (which I have had in cultivation for some years) agree with Franchet's description, particularly as regards the furfuraceous young leaves and stems, the fuscous coriaceous scales at base of the branches, and the ivory-white follicles, which he states to be very remarkable. My plant is quite glabrous and green, devoid of scales, and the fruit turns merely whitish when dead, as in most Sedums. I therefore retain the name *variicolor* till I have had an opportunity of examining Franchet's type.

Sedum venustum, Praeger, sp. nov. (Plate clxxix).

S. Smithi, Hamet ex descriptione est subsimile, sed *S. venustum* squamis caudicis brevibus in caudam linearem haud prolongatis, foliis oblanceolatis (nec longe ovatis vel ovato-sublinearibus) marginibus papillatis (nec integris), caulibus subasperis (nec glabris), staminibus 6–7 mm. (nec 2.9–5.4 mm.) longis, squamis nectariferis 1 mm. (nec .4–.65 mm.) longis, differt.

Herba perennis, subglabra, caules steriles non edens. *Caudex* erectus, plerumque simplex, crassus (ad 10 mm.), caulibus emarcidis dense obtectus, apice caules floriferos basi squamis

cinctos ferens. *Squamae* deltoideae, suborbiculares, acuminatae, paleaceae. *Caules* annui, numerosi, erecti, simplices, foliosi, 5–12 cm. longi, papillis minutis sparsis subasperi. *Folia* alterna, plana, supra subtusque glabra, internodiis longiora, breviter petiolata vel subsessilia, basi attenuata, in calcar non producta, oblanceolata vel elliptica, marginibus mammillatis, apice obtusa vel acuta, 6–12 mm. longa, 3–4.5 mm. lata. *Inflorescentia* terminalis, foliosa, 6–10 mm. longa, 10–15 mm. lata, e flore mediano et ramis floriferis 3–4 composita; rami bracteati, florem terminalem et saepe flores binos oppositos vel ramulos 2-floros oppositos ferentes; flores pedicellati, pedicellis mammillatis circa 4 mm. longis, quam flores brevioribus; bracteae foliis similes, inferiores folia aequantes, superiores minores. *Flores* plerumque 5-meri, saepe 4-meri, campanulati, pulchre rosei vel flavescentes. *Flos* ♂ : *Sepala* libera, deltoideo-lanceolata, obtusa vel subacuta, 3–4 mm. longa, basi 1.5 mm. lata, apice purea. *Petala* suberecta, oblongo-lanceolata, obtusa, 5 mm. longa, 1.5 mm. lata, nervo medio in mucronem apicem superantem prolongato. *Stamina* 10 vel 8, erecta, 6–7 mm. longa, epipetala quadrante adnata. *Squamae nectariferae* subquadratae, minute emarginatae, circa 1 mm. longae et latae. *Carpella* erecta, gracilia, cum stylis 4.5 mm. longa; styli longi erecti. *Flos* ♀ : *Sepala* longe deltoidea, obtusa, 3 mm. longa, basi 1 mm. lata. *Petala* anguste oblanceolata, obtusa, 5 mm. longa, 1.5 mm. lata. *Squamae nectariferae* subquadratae, emarginatae, 1 mm. longae, .75 mm. latae. *Carpella* erecta, 8 mm. longa, stylis suberectis, stigmatibus capitellatis.

(1) E. Tibet : Doker-la, forming big cushions among boulders, 16,000 feet. 1913. F. Kingdon Ward, No. 764. ♂ plant.

(2) Yunnan : Mekong-Salwin divide. Lat. 28° 12′ N. Alt. 14,000 ft. Aug. 1917. Plant of 2–4 inches. Flowers yellow, flushed rose. On ledges and in crevices of cliffs. G. Forrest, No. 14,592. (♂ plants).

(3) W. Yunnan : On moss-covered boulders in shady situations on the eastern flank of the Tali Range. Lat 25° 40′ N. Alt. 9–11,000 ft. Sept. 1906. G. Forrest, No. 5054. (Recorded as *S. fastigiatum,* H.f. et T. vel aff. in Notes R. Bot. Gard. Edinb. vii, 293). (Female plant).

(4) Sikkim : Dzalep la. Alt. 14,000 ft. 4.7.13. Yellow, among boulders and scree. R. E. Cooper, No. 152. (Male plant). (I think *venustum*, but towards *fastigiatum*).

(5) Upper Burma : Chimili Alps, 12–13,000 feet. Aug. 3, 1919. Sedum sp. Very abundant on high alpine cliffs and lawns. Flowers dull yellow, fading in fruit to rich blood red. R. Farrer, No. 1189. (Female plant).

An additional station may be added from the Kew Herbarium :—

(6) West Szechuan and Tibetan Frontier, chiefly near Tachienlu, 9000–13,500 feet. Sedum. Coll. A. E. Pratt, No. 60. (This is a female plant, a tall untidy form with the only branched rhizome seen in the whole series examined).

Hooker and Thomson (Journ. Linn. Soc. Bot., ii, 98) describe *S. fastigiatum* as having linear leaves. Clarke (in Hooker Flora Brit. India, ii, 419) says leaves linear-oblong, stems and leaves glabrous, cymes puberulo-pubescent. Two plants of *fastigiatum* which I have grown were wholly glabrous. *S. venustum* in flower closely approaches *fastigiatum*, but the leaves are oblanceolate or elliptic (up to ½ as broad as long), the stems roughened with papillae, and the cymes and bracts usually conspicuously mammillate. *S. fastigiatum* appears concentrated on if not confined to the Himalayas (I have not seen Forrest 6029, which M. Hamet records as *fastigiatum*), while *S. venustum* ranges over the region where Tibet, Yunnan and Burma meet. The species of this group are variable, and when not typical difficult to name, especially from dried material.

S. viscosum, Praeger.

Evidently a common plant in Southern China. It is the *S. drymarioides* var. *stellariaefolium* of Hamet (Forrest 197, Henry 4908, and Carles, Peking Hills, in Notes R.B.G. Edinb., viii, 139, etc.) While typical *drymarioides* and typical *viscosum* are very different, intermediates exist, and probably they are best considered as extremes of an aggregate species. But *stellariaefolium* is not a good name for my plant, being described by Franchet as having whitish small flowers like typical *drymarioides* (sepals 1 mm., petals 3 mm.) while in *viscosum* they are golden and large (sepals 2 mm., petals 5–5.5 mm).

S. viviparum, Maxim.

Korea :—Quelpaert : Hallaisan, July 1910. E. J. Taquet, No. 4251.

S. yunnanense, Franchet var. **Forresti**, Hamet.

(1) Szechuan : In rupest. schistos. in summo mont. supra Huali, alt. circiter 4200 m. May 27, 1914. C. Schneider, No. 1414.

(2) Szechuan : In reg. Knapic prope Molien, in saxosis. Alt. circiter 3000 m. May 25, 1914. C. Schneider, No. 3543.

(3) Yunnan : Mekong-Salwin divide. Lat. 26° 30′ N. Alt. 12,000 ft., July 1919. Plant of 6-10 inches. Flowers yellow, flushed crimson exterior. On ledges of cliffs and screes. G. Forrest, No. 18,187. (An extreme form, with linear almost entire leaves and very leafy inflorescence).

A fourth specimen collected by Maire at Ta-hai-tse plateau, Yunnan (No. 461/1913), has the narrow purple leaves of **var.** *Forresti,* but they are nearly entire as in var. *valerianoides.*

S. yunnanense, Franchet var. **valerianoides,** Hamet.

A common plant in Yunnan. Leaves usually very broad, but vary from orbicular to lanceolate. Inflorescence usually very broad, especially in the male plant.

EXPLANATION OF PLATES.

Illustrating Mr Lloyd Praeger's paper on some Asiatic Sedums.

PLATE CLXX.—1. *S. ambiguum*, sp. nov. *a*, flowering plant, × 1. *b*, barren plant, × 1. *c*, flower, × 6. *d*, sepal, petal, stamen, carpel, scale, all × 6.

2. *S. atuntsuense*, sp. nov. *a*, plant, × 1. *b*, leaf, × 3. *c*, flower, × 3. *d*, sepal, petal, stamen, scale, carpel, all × 6.

CLXXI.—1. *S. Barnesianum*, sp. nov. *a*, plant, × 2. *b*, caudex-leaf, × 4. *c*, stem-leaf, × 4. *d*, flower, × 4. *e*, sepal, petal, stamen, scale, carpel, all × 4.

2. *S. Cretini*, Hamet, female plant. *a*, plant, × 1. *b*, leaves, × 3. *c*, flower, × 3. *d*, sepal, *e*, petal, *f*, scale, *g*, carpel, all × 6.

CLXXII.—1. *S. Levcillcanum*, Hamet. *a*, plant, × 2. *b*, caudex-leaf, × 6. *c*, flower-stem, × 4. *d*, stem-leaf × 6. *e*, sepal, *f*, petal, both × 9.

2. *S. concinnum*, sp. nov. *a*, plant, × 2. *b*, flower, × 6. *c*, sepal, stamen, petal, scale, carpel, all × 12.

CLXXIII.—1. *S. discolor*, Franchet. *a*, plant, × 1. *b*, male flower, × 8. *c*, sepal, petal (front and side view), stamen, scale, carpel, of male flower, all × 8. *d*, hermaphrodite flower, × 8. *e*, sepal, petal, stamen, carpel, scale, of hermaphrodite flower, all × 8. *f*, leaves, × 2. *g*, female flower, × 8. *h*, sepal, petal, scale, of female flower, all × 8.

CLXXIV.—1. *S. horridum*, sp. nov. *a*, plant, × 1. *b*, flowering shoot, × 1. *c*, leaves, × 3. *d*, male flower, × 3. *e*, sepal, petal, carpel, scale, stamen, of male flower, all × 6.

2. *S. pseudostapfii*, sp. nov. *a*, flowering plant, × 1. *b*, barren plant, × 1. *c*, flower, × 6. *d*, sepal, petal, carpel, stamen, scale, all × 9.

3. *S. Stapfii*, Hamet, flower, × 1.

CLXXV.—1. *S. trientaloides*, sp. nov. *a*, plant, × 1. *b*, flower, × 3. *d*, sepal, petal, stamen, carpel, scale, all × 6.

2. *S. longistylum*, sp. nov. *a*, plant, × ½. *b*, inflorescence, × 1. *c*, *c*, flower, × 3, sepal, × 6, petal, × 6. *d*, stamen, carpel, scale, all × 6.

Explanation of Plates.—continued.

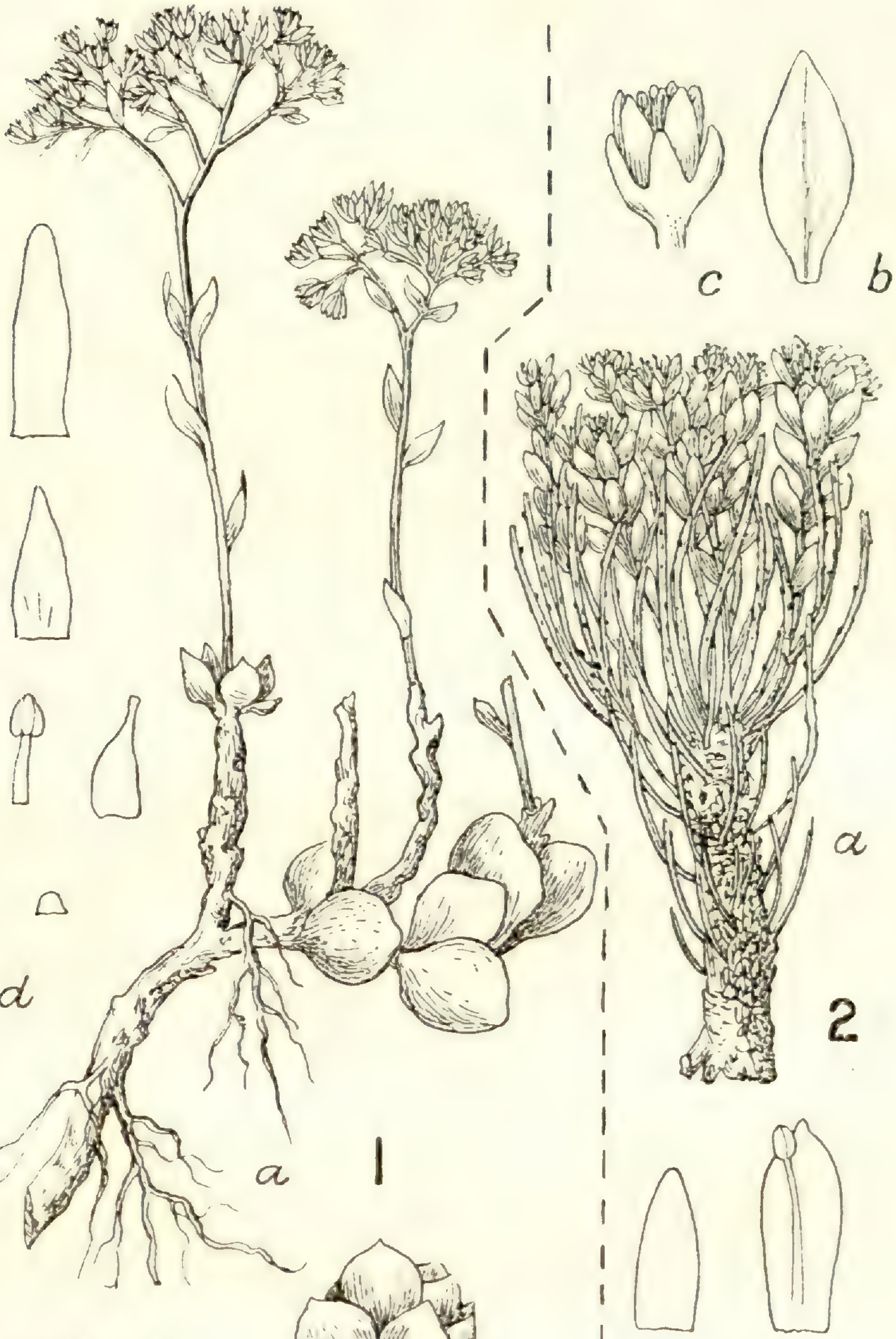
CLXXVI.—*S. macrocarpum*, sp. nov. *a*, plant, × 1. *b*, female flower, × 3. *c*, petal, sepal, scale, carpel, of female flower, all × 6. *d*, male flower, × 3. *e*, sepal, petal, carpel, scale, stamen, of male flower, all × 6.

CLXXVII.—1. *S. mekongense*, sp. nov. *a*, plant, × 1. *b*, leaf, × 3. *c*, flower, × 3. *d*, sepal, petal, carpel, stamen, scale, all × 6.

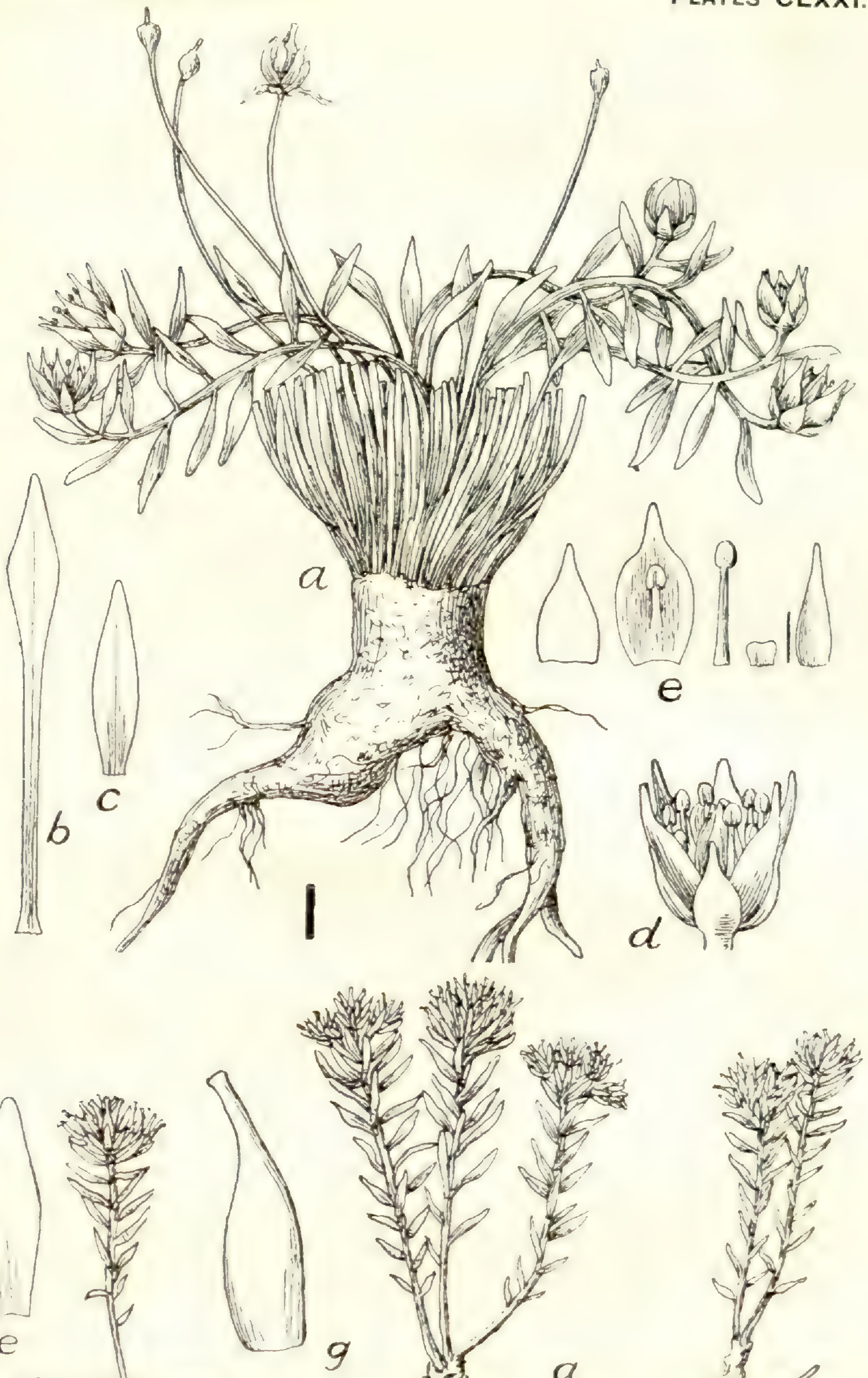
2. *S. orichalcum*, W. W. Sm. *a*, plant, × 1. *b*, *b*, root-leaves, × 1. *c*, stem-leaf, × 1. *d*, flower, × 3. *e*, sepal, petal, stamen, carpel, scale, all × 6.

CLXXVIII.—*S. robustum*, sp. nov. *a*, plant, × 1. *b*, male flower, × 3. *c*, sepal, petal, carpel, stamen, of male flower, all × 6.

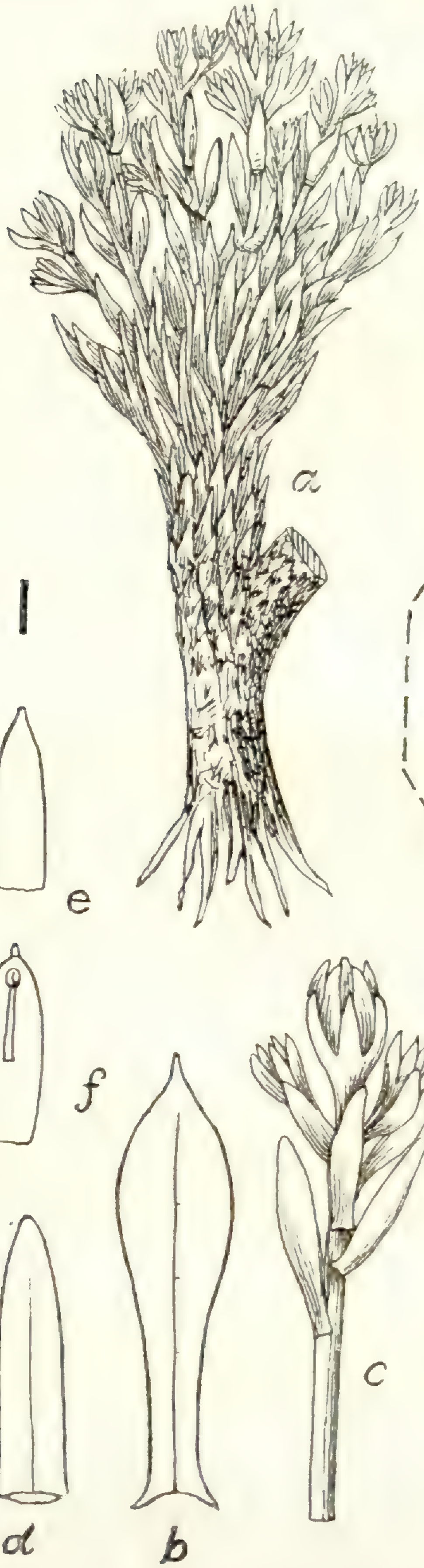
CLXXIX.—*S. venustum*, sp. nov. *a*, male plant, × ⅔. *b*, flowering shoot of ditto, × 1. *c*, leaf, × 3. *d*, male flower, × 3. *e*, petal, sepal, stamen, carpel, scale, of male flower, all × 6. *f*, female flower, × 3. *g*, petal, sepal, carpel, scale, of female flower, all × 6.



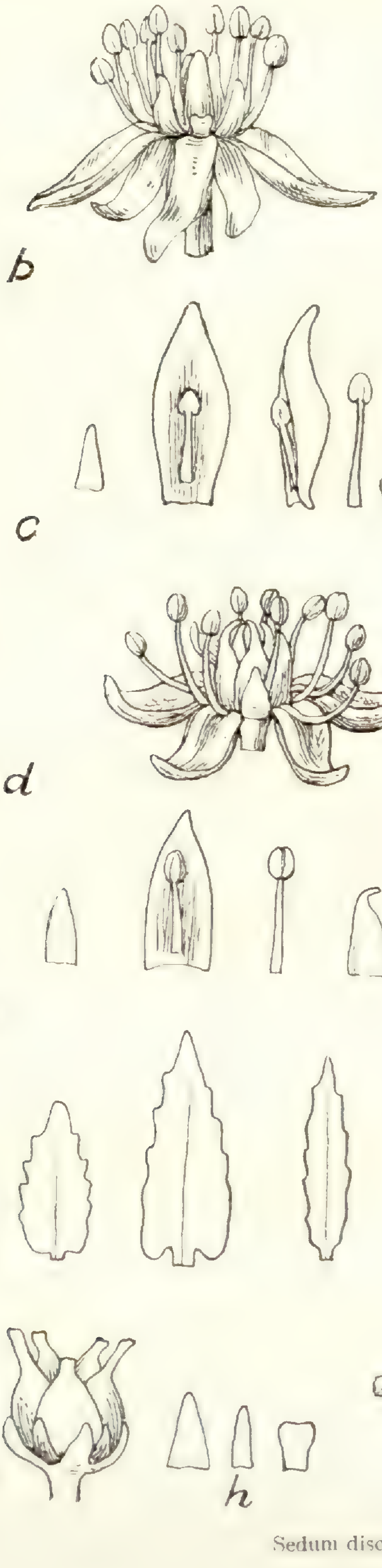
1. Sedum ambiguum, Praeger.
2. Sedum atuntsuense, Praeger.

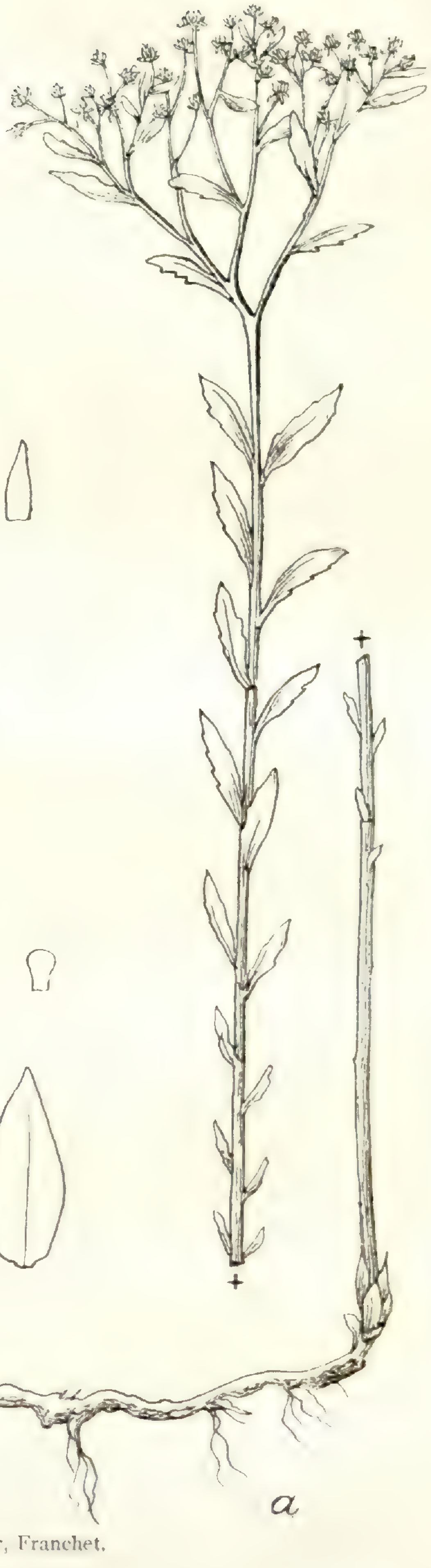


1. Sedum Barnesianum, Praeger. 2. Sedum Cretini, Hamet.

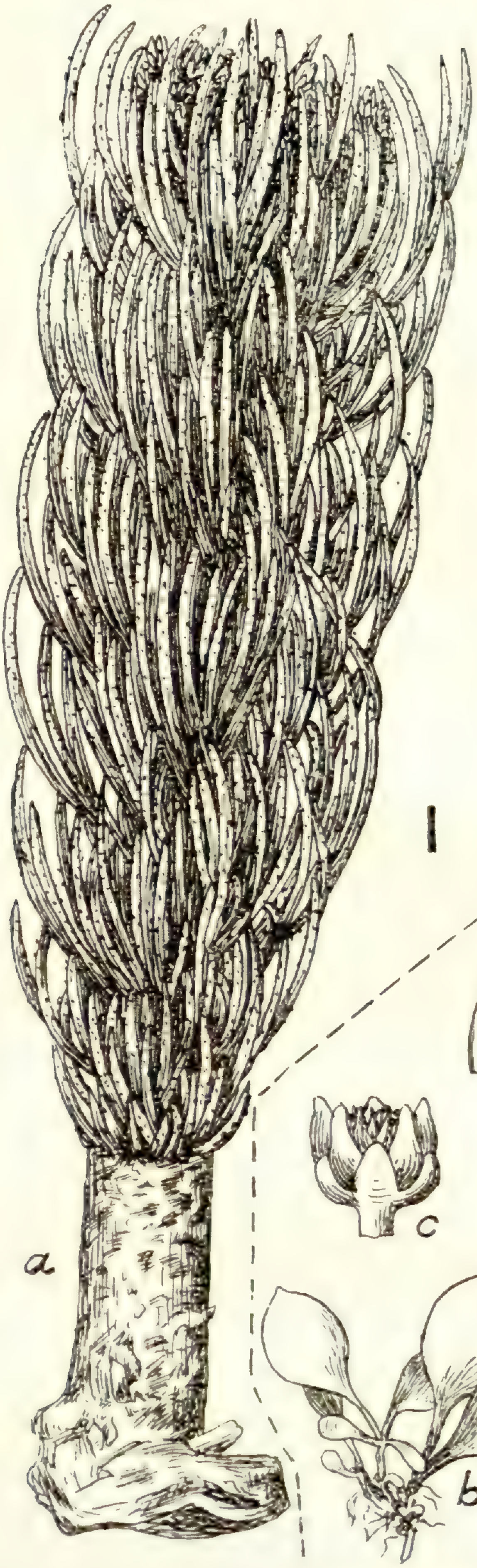


1. Sedum Leveilleanum, Hamet.
2. Sedum concinnum, Praeger.





Sedum discolor, Franchet.



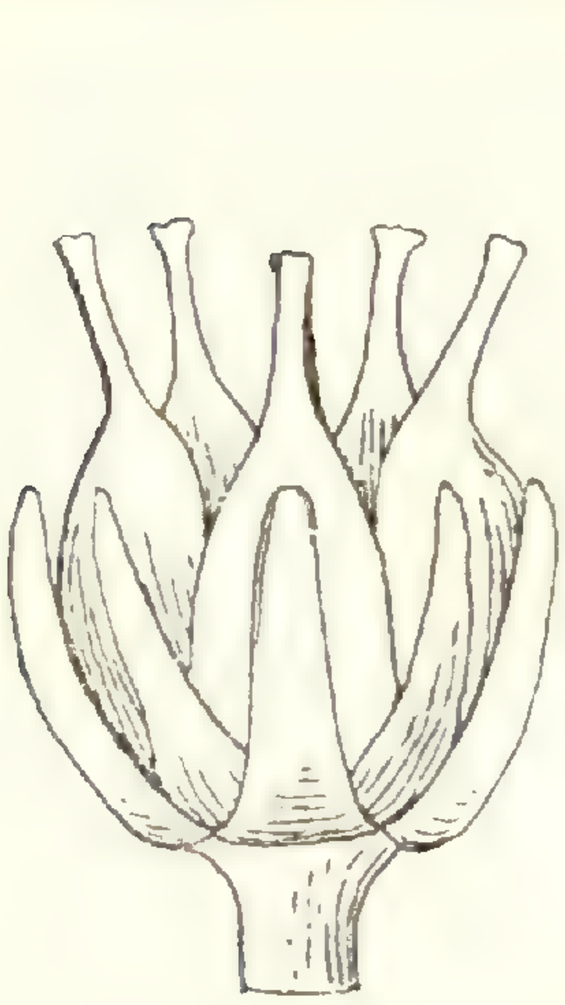
Sedum horridum, Praeger.

2. Sedum pseudostapfii, Praeger,

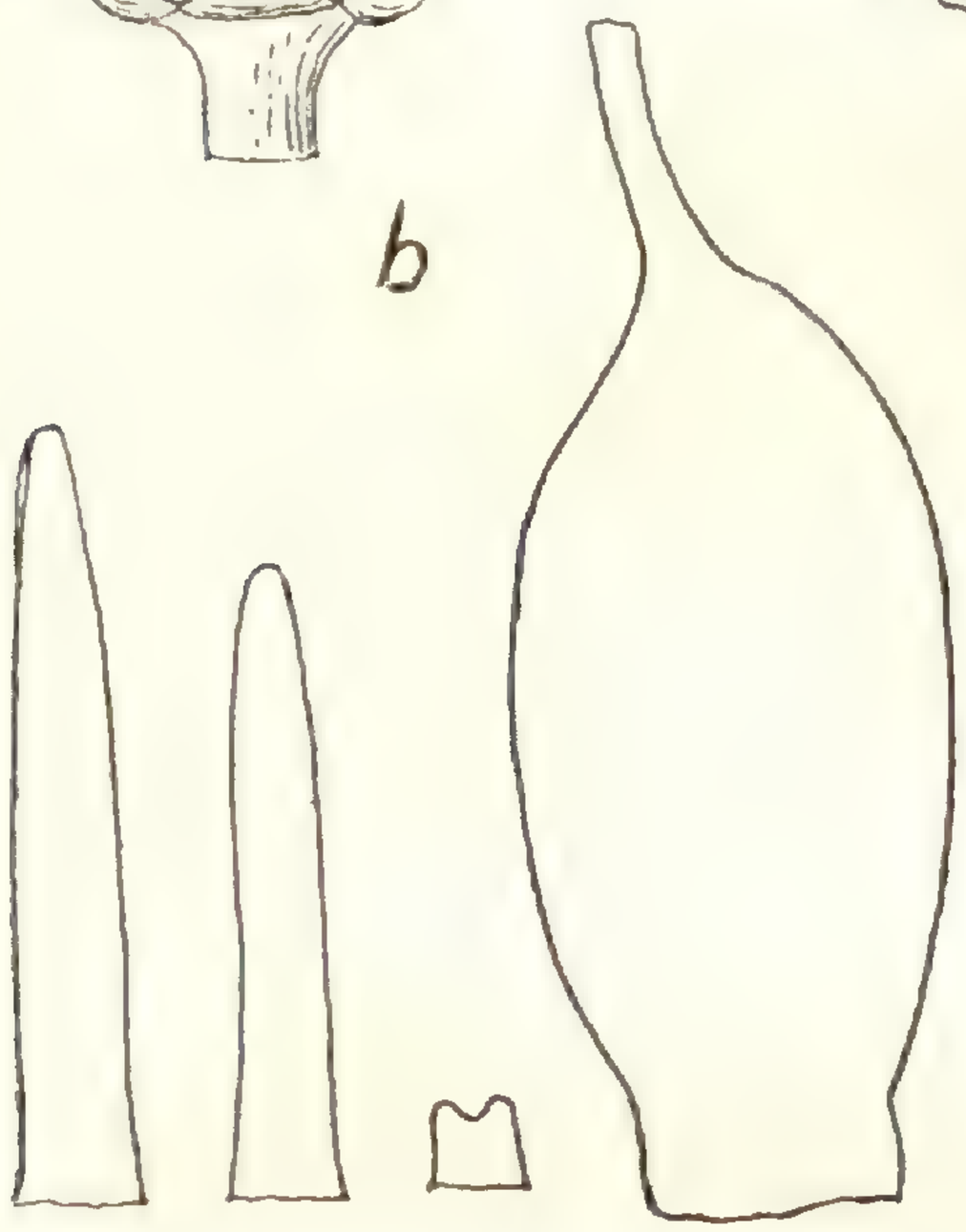
3. Sedum Stapfii, Hamet,

1. Sedum trientaloides, Praeger.

2. Sedum longistylum, Praeger.

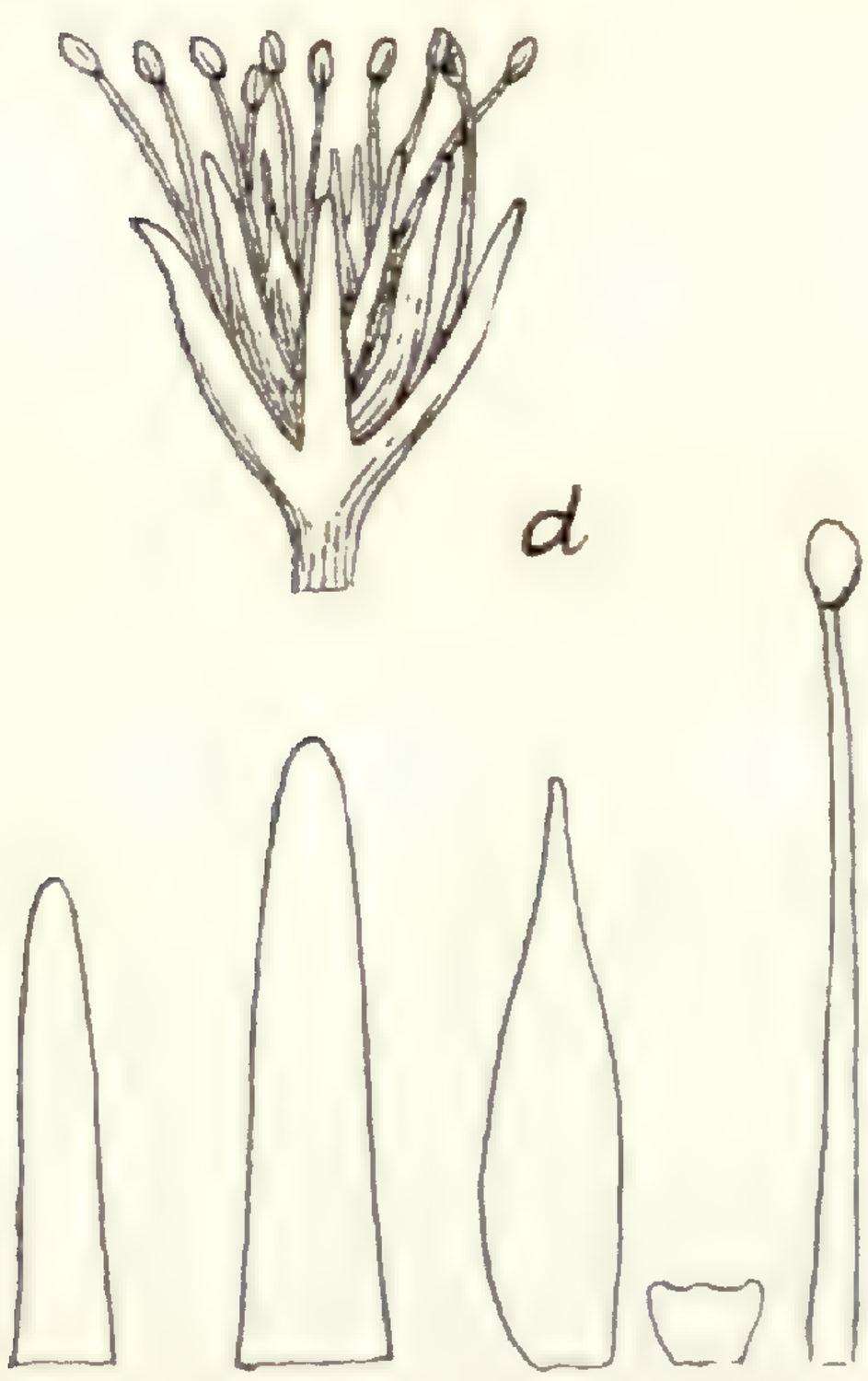


b



c

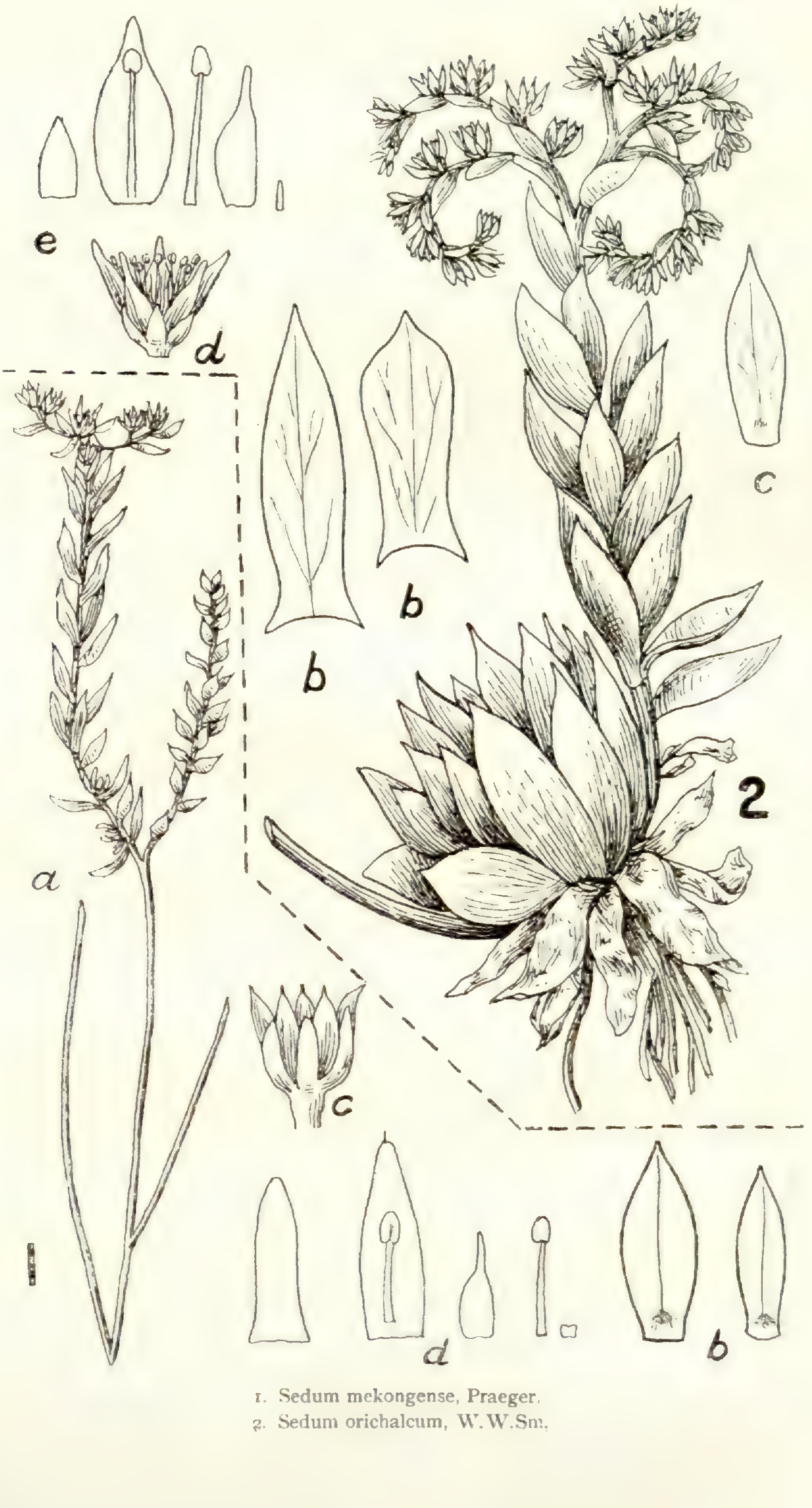
d



e

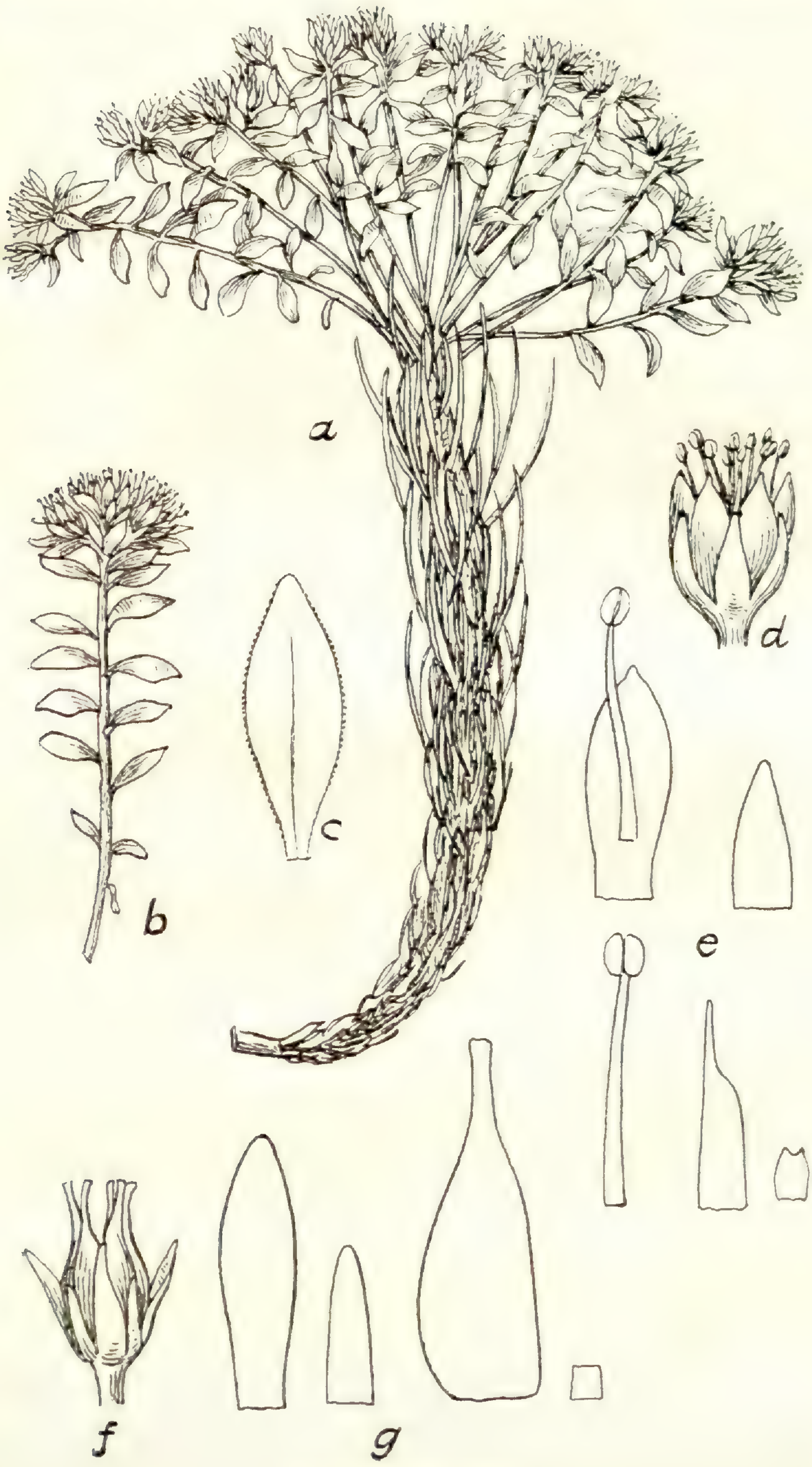
a

Sedum macrocarpum, Praeger.



1. Sedum mekongense, Praeger.
2. Sedum orichalcum, W.W.Sm.

Sedum robustum, Praeger.



Sedum venustum, Praeger.

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NOTES

FROM THE

ROYAL BOTANIC GARDEN, EDINBURGH.

NOVEMBER 1921.

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BOTANIC GARDEN EDINBURGH

MAY 31 1922

New Species of the Genera Phtheirospermum and Pedicularis.

BY

GUSTAVE BONATI.

PROFESSOR BAYLEY BALFOUR has kindly entrusted to me the study of numerous species of Pedicularis which have arrived at the Herbarium of the Royal Botanic Garden, Edinburgh, since the beginning of the great war. I express to him here as well as to Mr W. W. Smith my deep appreciation of the pleasure which the study of these beautiful plants has given me. The specimens which I have determined come from the collections of Mr George Forrest, Captain Kingdon Ward, Mrs Clemens, Mr Reginald Farrer, Mr C. Schneider, Mr Ridley and from the Reverend Fathers Maire and Monbeig.

Mr Farrer has visited alpine Burma and more particularly the Chimili Valley. His collections contain two new species :—*P. nobilis,* Bonati, *P. multicaulis,* Bonati; in addition two interesting varieties of species already known :—*P. Pantlingii,* Prain, var. *chimiliensis,* Bonati, and *P. siphonantha,* Don, var. *birmanica,* Bonati. This last plant is of great interest for it has the same relationship to *P. siphonantha,* Don that *P. birostris,* Bur. et Franch. bears to *P. cranolopha,* Maxim.

Mrs Clemens has sent only two species of which one is in too poor a state for determination; the second is *P. Tatarinowii,* Maxim., collected in Shansi.

Mr Ridley collected only *P. chinensis,* Maxim., in Kansu. Father Monbeig has sent from the region of Tsekou, *P. tenuisecta,* Franch., *P. verbenaefolia,* Franch., *P. Monbeigiana,* Bonati, *P. Lipskyana,* Bonati and *P. likiangensis,* Franch. Briefly, nothing new. Father Maire has collected in the region of Tong-chouan quite a series of species of which I give a list at the end of this paper, and among them I mark specially :—*P. dolichantha,* Bonati, *P. praealta,* Bonati, *P. tahaiensis,* Bonati, *P. tongtchouanensis,* Bonati, *P. tachanensis,* Bonati which are new.

Mr Schneider was a member of the Austro-Hungarian Dendrological Expedition which throughout the war was working in the north-east of Yunnan. He has sent to Edinburgh five

[Notes, R.B.G., Edin., Nos. LXIII-LXIV, November 1921.]

species or varieties, two of the latter being new. They are :—*P. densispica*, Franch., var. *Schneideri*, Bonati, *P. cephalantha*, Franch., var. *szetchuanica*, Bonati. Mr Handel-Mazzetti of the Vienna Museum was also a member of this Mission. He wrote me recently that he had collected more than a hundred species of Pedicularis in the region of the Chungtien Plateau. But up till now only a very small portion of the collected material has arrived in Europe. He has described recently four new species :—*P. aequibarbis*, Handel-Mazzetti, *P. dolichocymba*, Handel-Mazzetti, *P. parvifolia*, Handel-Mazzetti, *P. pseudo-versicolor*, Handel-Mazzetti, among which his *P. dolichocymba* is my *P. tristiformis*, collected by Captain Kingdon Ward on the Chungtien Plateau as long ago as 1912, but which I had never been able to publish. Mr Handel-Mazzetti has very kindly sent me his diagnosis and some material for study for which I am very much obliged.

The most important collections are the two made by Mr George Forrest and Captain Kingdon Ward. The collection of Mr Forrest contains 78 numbers among which I have found the following new species :—*P. aequibarbis*, Handel-Mazzetti, *P. dolichocymba*, Handel-Mazzetti, *P. humilis*, Bonati, *P. kariensis*, Bonati, *P. cymbalaria*, Bonati, *P. lucifuga*, Bonati, *P. galeata*, Bonati, *P. tribuloides*, Bonati, *P. Handel-Mazzettii*, Bonati, and numerous varieties. The same remarkable collection contains a new species of the genus *Phtheirospermum* :—*P. auratum*, Bonati. I have also met with again in the collection of Mr Forrest many rare species of which the geographical distribution is little known such as :—*P. taliensis*, Bonati, *P. Monbeigiana*, Bonati, *P. Forrestiana*, Bonati, *P. Smithiana*, Bonati, *P. sigmoidea*, Franch., *P. tsekouensis*, Bonati, *P. Viali*, Franch., *P. Bietii*, Franch., *P. pseudo-melampyriflora*, Bonati, *P. yargongensis*, Bonati, *P. dichotoma*, Bonati, *P. cranolopha*, Maxim., *P. hirtella*, Franch., *P. pseudo-ingens*, Bonati, *P. strobilacea*, Franch., etc., etc.

The collection of Captain Kingdon Ward contains only 40 numbers, but it is equally of great interest. It contains the following new species :—*P. quadrata*, Bonati, *P. praeruptorum*, Bonati, *P. Wardii*, Bonati, *P. lacerata*, Bonati, *P. insignis*, Bonati, *P. atra*, Bonati, P. *pseudo-atra*, Bonati, *P. Reynieri*, Bonati, *P. nobilis*, Bonati, *P. birmanica*, Bonati, *P. laktangensis*, Bonati. Here also we find again many rare species whose distribution is little known such as :—*P. macrosiphon*, Franch., *P. strobilacea*, Franch., *P. dichotoma*, Bonati, *P. taliensis*, Bonati, *P. Duclouxii*, Bonati, *P. dolichocymba*, Handel-Mazzetti, *P. cymbalaria*, Bonati. I describe further on all the new species and varieties. Then I give synoptic tables and indicate the different

series of the genus containing the species described since 1910. Finally I give a list of the species recently collected by the different collectors.

706 **Phtheirospermum auratum,** Bonati. Sp. nov.

Planta pluricaulis perennis. Rhizoma breve verticale, radiculis longissimis lineatis vel vix dilatatis tectum. Caules 30–40 cm. alti, tetrangulares, erecti, basi simplices ac glabri, decumbentes, ramosi, summo molliter villosi, non glandulosi; ramis gracilibus patulis. Folia opposita, glabra vel paulo villosa, membranacea, nervis inferne eminentibus ac reticulatis, longe petiolata; petiolis basi stricte alatis ac semi-amplexicaulibus, inferioribus 3–4 cm. longis, superioribus 5–10 mm.; limbo 2–3 cm. longo, 1–4 cm. lato, pinnatisecto, loborum 5–7 jugis; lobis inferioribus petiolulatis, superioribus sessilibus ac petiolo decurrentibus, omnibus profunde pinnatifidis, lobulis obtusis et acutidentatis. Bracteae parvae (5–8 mm.) longe petiolulatae, trilobatae, lobis acutidentatis. Flores axillares, oppositi, valde distantes, breviter pedunculati; pedunculis inferioribus 1–2 mm. longis; superioribus subsessilibus, deinde sessilibus. Calyx membranaceus, perlucidus, villosus, costis 5 ac nervis 10 longitudinalibus non reticulatis, infundibuliformis circa 4 mm. longus; dentibus 5 lanceolatis acutis circa 1 mm. longis. Corolla aurea, 10–12 mm. longa, tubo brevissimo lato circa 2 mm. longo; galea paulo villosa, dorso valde curvata, labium inferius multo superante, integra; labio inferiore ciliato circa 5 mm. longo, lobis subaequalibus, medio cucullato integro, lateralibus in media parte profunde incisis margine subulatis. Staminum filamenta glabra, basi inserta; antherarum loculis ovato-oblongis, summo longe subulatis. Capsula ex toto glabra, summo longe attenuata circa 1 cm. longa. Semina comparative magna, 2 mm. longa, ovata basi truncata, testa luteola in longitudine striata obscure reticulata.

"West China :—Open moist shady situations in pine forests on the mountains of the Chungtien Plateau, Yunnan. Lat. 27° 30′ N. Alt. 12,000 ft. Plant of 9-16 ins. Flowers deep golden-yellow. July, 1914." G. Forrest. No. 12,873.

The plant is very definitely characterised by its stems glabrous and shining at the base, by its corolla of a fine golden yellow, by its long-petioled leaves, slightly hairy with large lobes, and above all by its seeds relatively very large (2 mm). with a clear yellow wrinkled-alveolar seed-coat. It differs from *Phth. chinense,* Bge., by its relatively small yellow corolla, by its stems glabrous at the base and not glandular; its seeds have coats of the same colour, but are three or four times larger. It differs from *Phth.*

tenuisectum, Bur. et Franch., of which the corolla is also yellow, by its much more developed leaves with large lobes, by its diffuse branches, its glabrous capsules, etc. It differs from *Phth. Parishii*, Hook. f., of which the colour of the corolla is unknown to me, by its larger long-petioled leaves, with broad non-linear lobes, by its larger glabrous capsule, by the seeds seven or eight times the size and by its seed coat being clear yellow and not black. Finally it differs from *Phth. glandulosum*, Benth., which is only imperfectly known to me, by its leaves not being trifid, by its equally lobed calyx, etc.

Phth. Esquirolii, Bonati in Monde des Plantes (1907) p. 14 is only a local form peculiar to Kweichow of *Phth. chinense*, Bge.

251 **Pedicularis humilis**, Bonati. Sp. nov. (Longiflorae).

Perennis? Radices fusiformes elongatae. Caules multi patuli, repentes, glabrescentes, simplices vel paulo ramosi, 5–15 cm. longi. Folia radicalia longe petiolata, glabra; petiolis stricte alatis basi dilatatis circa 2 mm. longis; limbo circa 15 mm. longo 7–10 mm. lato pinnatisecto, 5–6 jugis loborum ovato-acutorum pinnatilobulatorum; lobulis acutis et acutidentatis. Folia caulinaria alterna, raro subopposita, radicalibus similia, sed breviora ac brevius petiolata, lobis linearibus basi arcuatis. Bracteae foliiformes. Flores axillares, pauci, pedunculati, erecti; pedunculis 3–10 mm. longis glabris. Calyx membranaceus, glabrescens, margine ciliatus, 5–6 mm. longus, antice profunde fissus subspathaceus, lobis duobus 1–2 mm. longis basi constrictis ac stipitatis summo palmatisectis; segmentis linearibus acutidentatis, nervis paulo eminentibus summo reticulatis. Corolla rosea; tubo cylindrico villoso 10–25 mm. longo; galea basi contorta pilis glandulosis brevissimis tecta, cum crista paulo eminente; in parte inferiore circa 3 mm. longa; in parte horizontali falciformi lente in apicem sigmoideum 7–8 mm. longum filiformem summo breviter bifidum attenuata; labio inferiore patulo parvo suborbiculari, 9–10 mm. longo, circa 15 mm. lato, superficialiter trilobato; lobo medio profunde bilobato, lateralibus minore; lobis lateralibus emarginatis, omnibus margine dense ciliatis. Stamina ad summum tubi inserta; filamentis duobus villosis. Antherae ovoidae, summo rotundae, loculis obtusis. Capsula ac semina?

"West China :—Shweli-Salween divide. Moist stony pasture. Lat. 25°30′N. Alt. 10,000 ft. Plant of 3–5 ins. Flowers rose. July 1913." G. Forrest. No. 11,969.

The species belongs to the series of the *Longiflorae* in view of its bi-lobed calyx and the elongated corolla tube. Its lower cauline leaves seem to be sometimes opposite. It is akin to *P. armata*,

Maxim., but very different in the calyx; it differs otherwise distinctly from that species in the form of its hood; two staminal filaments alone are hairy in *P. humilis*, Bonati.

Pedicularis dolichantha, Bonati. Sp. nov. (Longiflorae).

Planta perennis. Rhizoma obliquum elongatum, squamis linearibus brevibus et obtusis tectum, radicibus pinguibus elongatis. Unicaulis. Caulis erectus, simplex, 15-30 cm. altus, fistulosus, angulosus, paulo villosus. Folia radicalia caduca. Caulinaria multa, alterna, villosa, petiolata, linearia vel oblonga, pinnatisecta vel profunde pinnatifida; 10–12 jugis loborum ovatorum vel triangulatorum acutidentatorum; petiolis 15–40 mm. longis stricte alatis ac margine ciliatis; limbo pingue, 25–60 mm. longo, circa 10 mm. lato; lobis 3–5 mm. longis, basi plus minusve decurrentibus. Bracteae foliiformes, petiolulatae, villosissimae. Flores omnes axillares, pedunculati; inferiores valde sparsi; pedunculis gracilibus nigrescentibus erectis glabrescentibus circa 5 mm. longis. Calyx elongatissimus, cylindricus, hirtus, antice profunde fissus circa 12 mm. longus lobis semper duobus basi constrictis breviter petiolulatis profunde palmatifidis, segmentis paucis plus minusve dentatis circa 3–5 mm. longis. Corolla rosea, tubo 30–40 mm. longo extus villoso cylindrico; galea glabra, in parte inferiore breviter basi contorta sicut in *P. siphonantha*, D. Don; in parte anteriore addita crista elongata, abrupte contracta in apicem filiformem sigmoideum circa 10 mm. longum summo haud bifidum; labio inferiore margine ciliato lobo medio cucullato ovato-obtuso non-emarginato, lateralibus multo angustiore. Stamina fauce inserta, filamentis duobus villosis. Capsula ac semina?

Eastern Yunnan:—"Pedicularis annuel, isolé, dressé; fl. rose sombre. Pâturages—haut plateau de Ié-ma-tchouan. Alt. 3,200 m. Août 1913." E. E. Maire. No. 672.

Eastern Yunnan:—"Scrophularinée annuelle. Fl. roses. Lagunes du haut plateau de Ta-hai. Alt. 3,200 m. Juillet 1913." E. E. Maire. No. 688.

The plant is near certain forms (*Hookeriana*) of *P. siphonantha*, D. Don. The differences are:—(1) The hood is furnished with a crest which is prolonged under the base of the beak; (2) the corolla tube is hairy on the outside; (3) the beak is sigmoid not bifid at the point; (4) the lower lip has a non-emarginate median lobe; (5) the calyx has lobes more deeply cut and always two in number. It approaches equally *P. megalantha*, D. Don of which it has the inflorescence and the small flowers. It is distinguished however at a glance by its 2-lobed calyx.

Pedicularis siphonantha, D. Don, var. **birmanica,** Bonati

Var. nov.

This differs from typical *P. siphonantha,* D. Don by its larger corolla with the median lobe of the lower lip more deeply bilobulate and with the tube hairy on the outside, especially at the top. The beak relatively short is deeply bifid and the two lobes are almost perpendicular one to the other as they are in *P. birostris,* Bur. et Franch. All the other characteristics are those of typical *P. siphonantha*—calyx with three teeth, ciliate lip, two hairy filaments, etc. The corolla recalls that of *P. Delavayi,* Franch. In brief, this plant has the same relationship to *P. siphonantha,* D. Don as *P. birostris,* Bur. et Franch. has to *P. cranolopha,* Maxim.

"Upper Burma :—Chimili Valley. Alt. 12,000 ft. Open high alpine meadows and rocks, July, 1919." R. Farrer. No. 1140.

Series Longiflorae.

A. **Calyx with five teeth.**

Corolla purple; lower lip ciliate on the margin and with the median lobe deeply bilobulate; all the filaments hairy. . . . . 1. *P. Delavayi,* Franch.

B. **Calyx with two or three teeth.**

*Calyx with two teeth. Tube of the corolla hairy; lower lip ciliated on the edges.

+All the staminal filaments hairy.

△Calyx with flabellate teeth; beak sigmoid, emarginate at the tip. . . . 2. *P. armata,* Maxim.

△△Calyx with ovate-oblong teeth; beak horse-shoe shape, entire at the tip. . . . 3. *P. bidentata,* Maxim.

++Only two staminal filaments hairy.

△Calyx glabrous, short (5–6 mm.); hood glandular with a crest slightly projecting; lower lip with median lobe bilobulate and with lateral lobes emarginate. A dwarf plant with creeping stems. 4. *P. humilis,* Bonati.

△△Calyx hairy, elongated (12 mm.); hood glabrous with long prominent crest; lower lip with lobes entire, the median cucullate. . 5. *P. dolichantha,* Bonati.

**Calyx with three teeth.

+Teeth of calyx all incised.

△Calyx short with sub-equal teeth; tube of the corolla short (10–15 mm.); hood without crest; two filaments glabrous. . . . 6. *P. strobilacea,* Franch.

△△Calyx much developed with leaf-like lobes; tube of corolla 3–5 cm. long; hood with a crest; all the filaments hairy; lower lip ciliate on the edges. . . . . 7. *P. Garnieri,* Bonati.

++Tooth at top of calyx entire.

△Hood with a crest much developed; lower lip glabrous; two filaments hairy; lobes of calyx very large and leaf-like; corolla yellow. .8. *P. cranolopha,* Maxim.

△△Hood without crest; lower lip ciliate.

±All the staminal filaments hairy.

□Corolla yellow.

†Lower lip with only the median lobe emarginate; beak circinate, entire at the tip. . . . . 9. *P. chinensis,* Maxim.

††Lower lip with all the lobes emarginate; beak circinate, bifid at the tip. . . . . 10. *P. longiflora,* Rudolph.

□□Corolla purple.

†Stems tall, upright, branched; flowers very numerous, large, in terminal spikes; beak sigmoid, 1–2 cm. long. 11. *P. sigmoidea,* Franch.

††Stem dwarf (4–5 cm.) generally simple; flowers axillary not numerous; beak falciform 2–3 mm. long, bifid at tip. . 12. *P. latituba,* Bonati.

±±Only two staminal filaments hairy; beak circinate, bifid at the tip. . 13. *P. siphonantha,* D. Don.

Pedicularis insignis, Bonati. Sp. nov. (Macranthae.)

Perennis. Radix crassa, plus minusve ramosa, radiculis linearibus pinguibus elongatis. Caulis simplex, erectus, paulo villosus, paulo foliatus, 15–18 cm. altus. Folia radicalia 8–9 cm. longa, oblonga, villosa, praesertim inferne plus minusve longe petiolata; petiolis alatis 35–50 mm. longis; limbo oblongo obtuso 5–7 cm. longo 15–20 mm. lato, pinnatifido nervo medio eminente; loborum inaequalium 12–13 jugis; lobis inferioribus multo minoribus; omnibus obtusis superficialiter lobulatis; lobulis rotundis obtusis. Folia caulinaria radicalibus similia, sed breviora ac breviter petiolata. Bracteae inferiores foliaceae, basi membranaceae ac valde dilatatae; superiores sessiles, ovato-obtusae, integrae vel saepius trifidae, lobo medio spathulato, lateralibus brevissimis ac basi constrictis; omnibus bracteis quam flores brevioribus. Flores in uvis spiciformibus basi valde interruptis; pedunculis gracilibus erectis villosis 10–15 mm. longis. Calyx cylindricus, villosus, 8–12 mm. longus, lobis 5 lanceolato-acutis 4–5 mm. longis; lobo medio lateralibus paulo breviore; omnibus incisis dentibus rotundis; nervis paulo eminentibus reticulatis. Corolla purpurea circa 15 mm. longa; tubo cylindrico summo non dilatato glabro circa 8 mm. longo; galea in parte verticali brevissima, semi-orbiculari tubum aequan-

te, crista valde eminente antice addita ac abrupte in apicem subfiliformem lineatum et semi-orbicularem 3–5 mm. longum contracta margine dente parvo utrinque addito; labio inferiore sessili latissimo margine glabro, lobis 3 paulo profundis subaequalibus rotundis, medio lateralibus minore 2 mm. longo, 5 mm. lato. Stamina fauce inserta; filamentis omnibus in medio villosis, ceterum glabris. Capsula ac semina?

"S.E. Tibet:—Doker-la; 14,000 ft. On screes. Flowers crimson. 1913." F. Kingdon Ward. No. 1105.

This is a very elegant species belonging to Sir D. Prain's series of the "Macranthae." This series at present contains four species easily distinguished by the help of the following key.

Series Macranthae.

A. Lower lip with margin glabrous.

*Calyx not split in front; corolla purple, the tube not exceeding the calyx. Staminal filaments all hairy, inserted on the throat of the corolla; beak not bifid . . . . . 1. *P. insignis,* Bonati.

**Calyx split in front quite to the middle of its length; beak not bifid; stamens inserted at the middle of the tube.

+Hood 1½ times as long as the beak, erect at the base; lower lip of the corolla with lobes subequal; corolla rose-coloured or yellow with hood red; all the filaments hairy. . . . . 2. *P. macrantha,* Klotsch.

++Hood three times as long as the beak, subrefracted at the base; lower lip with median lobe ⅓ as large as the lateral; corolla yellow; filaments hairy. . . . . 3. *P. Scullyana,* Prain.

B. Lower lip long-ciliate on the edges. Calyx split nearly to the base; median lobe of lower lip emarginate, half as large as the lateral; corolla purple; all the staminal filaments hairy. . . . 4. *P. Elwesii,* Hook. f.

2085 **Pedicularis lacerata,** Bonati. Sp. nov. (Longipes).

Radix? Caulis gracilis debilis repens angulosus glaber, 20–35 cm. longus, e basi ramosus, ramis diffusis et oppositis. Folia glabra multa opposita longe petiolata petiolis 6–10 cm. longis patulis non alatis; limbo 5–8 cm. longo, 15–25 mm. lato, ovato-oblongo bipinnatisecto, lobis paucis sparsis petiolulatis 15–30 mm. longis; lobulis linearibus obtusis denticulatis 2–3 mm. longis. Bracteae foliis similes sed brevius petiolatae. Flores omnes axillares oppositi longissime pedunculati, pedunculis 15–30 mm. longis gracilibus flexuosis glabris plus minusve post

anthesin reflexis. Calyx villosissimus ovatus inde campanulatus 5–8 mm. longus; tubo 3 mm. longo membranaceo antice non fisso; nervis 5 primariis ac 10 secondariis non reticulatis; lobis 5 circ. 3–5 mm. longis basi subfiliformibus, summo stricte lanceolato-acutis ac breviter lobulatis. Corolla purpurea; tubo recto cylindrico glabro calycem paulo superante circa 8 mm. longo intus villoso; galea glabra, in parte inferiore tubum recte sequente ac aequante; in parte horizontale falciformi, circa 5 mm. longa et in apicem rectum integrum 3–5 mm. longum finita; labio inferiore patulo superius aequante superficialiter trilobato margine ciliato; lobis ovato-obtusis, medio lateralibus minore. Stamina ad trientem infimum tubi inserta, omnia undique villosissima. Capsula glabra, ovato-orbicularis, in spinam obliquam circa 2 mm. longam supra attenuata, calycem paulo superans. Semina?

"West China:—A-tun-tsu. Alt. 13,000 ft. In damp shade in forest and shrub belt. August 1913." F. Kingdon Ward. No. 935.

A plant allied to *P. axillaris*, Franch., from which its main differences are:—(1) the form of the leaves, (2) the hairy calyx, (3) all the staminal filaments hairy to the base. Its capsule is equally as remarkable as and resembles those of *P. Souliei*, Franch. and *P. Petitmengini*, Bonati. Unfortunately we have no certain and authentic specimens of the capsule of *P. axillaris*, Franch. It is equally near to *P. heterophylla*, Bonati, collected in 1913 by Rev. Père Soulié in the forests of Yargong, a region relatively near to A-tun-tsu; the leaves and the hairy calyx are similar in the two plants but *P. lacerata*, Bonati has:—(1) the lower lip ciliate on the edges, (2) the staminal filaments all hairy to the base, (3) the lower lip with the middle lobe smaller than the lateral.

Pedicularis tribuloides, Bonati. Sp. nov. (Longipes).

Perennis. Rhizoma horizontale. Radices crassae fusiformes elongatae. Caules multi diffusi repentes ramosi villosi lanati cinerei cylindrici, 10–20 cm. longi. Folia radicalia caduca. Folia caulinaria inferiora et media opposita, petiolata ovato-oblonga pinnatisecta, 6–8 jugis segmentorum alternorum oblongorum basi ac summo attenuatorum sessilium; petiolis 6–12 mm. longis stricte alatis; limbo 25–30 mm. longo, 10–15 mm. lato; lobis 6–8 mm. longis, 2–4 mm. latis. Folia superiora inferioribus similia, sed breviora ac subsessilia. Flores omnes axillares, pedunculis 5–7 mm. longis erectis ac lanatis. Calyx villosus cylindricus aut globulosus, 7–8 mm. longus, non antice

fissus nervis 10 non anastomosantibus, lobis 5 aequalibus vel paulum inaequalibus, circiter 2 mm. longis, basi constrictis ac stipitatis, ovato-acutis, summo profunde incisis acutidenticulatis. Corolla rosea; tubo longissimo, usque ad 4–5 cm. longo in totius incrementi tempore, glabro cylindrico summo vix dilatato; galea glabra, in inferiore parte erecta, 4–5 mm. longa, in horizontali parte vix curvata, 5–6 mm. longa, in rostrum conicum ac rectum circiter 2 mm. longum lente attenuata, non cristata. Labium inferius basi cordiforme, 10–12 mm. longum, superius paulo superans, margine glabro, superficialiter trilobatum, lobo medio laterales paulo superante parvo (2.5–3 mm.) cucullato. Stamina fauce inserta, filamentis glabris, antheris cordiformibus summo et loculis apiculatis. Capsula ac semina?

"West China :—Salween Valley. Margins of thickets, by streams. Lat. 28° 10′ N. Alt. 10,000 ft. Plant of 6–10 ins. Flowers rose. June 1917." G. Forrest. No. 16,207.

This species belongs to the *Axillares* and to the series *Longipes*. Its corolla as also that of the following species is almost exactly like that of *P. macrosiphon*, Maxim., but the calyx has five teeth all similar and incised, and the elongated diffuse stems bear opposite leaves at their base. It differs from *P. laxiflora*, Franch. in the form of its leaves and in their disposition. They are alternate at the summit of the stems and opposite at the base, while they are alternate at the base in *P. laxiflora*, Franch. The corolla is also very different. Finally *P. tribuloides* is densely covered with greyish woolly hairs which give it a peculiar ashy colour.

Pedicularis lucifuga, Bonati. Sp. nov. (Longipes).

Planta, primo adspectu, *P. tribuloidi*, Bonati valde affinis. Tamen ab illa differt :—(1) caulibus angulosis longioribus, 30–40 cm. vel ultra longis, ramosis villosissimis, (2) foliis longius petiolatis longioribus minus carnosis; (foliorum inferiorum lobis saepe petiolulatis, sicut in *P. laxiflora*, Franch.); petiolis 10–30 mm. longis; limbo 50–60 mm. longo ac circa 20 mm. lato; 8–10 jugis loborum 10 mm. longorum ac circa 5 mm. latorum, (3) pedunculis longioribus (10 mm.) graciliioribus flexuosis diffusis, (4) calyce circa 10 mm. longo, lobis subfiliformibus, summo vix dilatatis ac incisis.

Corollae forma est eadem, et tubus pariter elongatus, sed labium inferius margine ciliatum est, et lobus medius est linearis, oblongus ac multo longior. Bina staminum filamenta glabra, bina altera villosa. Capsula ovoidea calycem non superans, apice 1–1.5 mm. longo latere dextro ejecto.

"S.E. Tibet :—On Ka-gwr-pw, Mekong-Salween divide. Shady pasture on the margins of pine forests. Lat. 28° 25′ N. Alt. 10,000 ft. Plant of 9 16 ins. Flowers rose, beak darkest. July 1917." G. Forrest. No. 14,200.

The group *Longipes* at present contains 11 species which can be classified as follows :

Series Longipes.

A. Tube of the corolla very long, 4 to 5 times as long as the calyx.

a. Lower lip ciliate on the edges.

*Staminal filaments glabrous; tube of the corolla hairy on the exterior; leaves bipinnatisect, segments linear ± subfiliform; beak very long. . . . . 1. *P. batangensis*, Bur. et Franch.

**Two staminal filaments hairy; tube of the corolla glabrous; leaves pinnatisect, with lobes broadly oval and often petiolulate; beak conical, very short. . . . . 2. *P. lucifuga*, Bonati.

b. Lower lip glabrous on the edges.

*Lower leaves very large, 10–12 cm.; plant glabrous or glabrescent; tube of the corolla hairy; beak long. . . . . 3. *P. Omeiana*, Bonati.

**All the leaves approximately of the same size; plant covered with woolly hairs and having an ashy appearance; tube of the corolla glabrous; beak short, similar to that of *P. macrosiphon*. . . 4. *P. tribuloides*, Bonati.

B. Tube of the corolla short, at most 1½–2 times as long as the calyx.

a. Lower cauline leaves alternate, those of the branches opposite; staminal filaments glabrous. . . . . 5. *P. laxiflora*, Franch.

b. Leaves all opposite.

*Staminal filaments all glabrous.

+Calyx with lateral teeth flabellate; the middle tooth lanceolate; leaves with broad segments petiolulate; peduncles equalling the leaves. 6. *P. filicifolia*, Hemsl.

++Calyx with teeth all alike.

△Peduncles short, scarcely exceeding the length of the calyx; leaves with segments broad and petiolulate. . . . . 7. *P. nasturtiifolia*, Franch.

△△Peduncles long.

±Teeth of calyx flabellate.

□Peduncles 4–5 times as long as the calyx, corolla yellow; leaves bipinnatisect. . . . .

. . . . . 8. *P. Balfouriana,* Bonati.

□□Peduncles 1½–2 times as long as the calyx, corolla purple. . . 9. *P. axillaris,* Franch.

±±Teeth of calyx lanceolate, entire or very slightly incised. . . . 10. *P. longipes,* Maxim.

**At least two staminal filaments hairy.

+Two filaments hairy; lower lip glabrous, beak short. . . . . 11. *P. heterophylla,* Bonati

++All the filaments hairy; lower lip ciliate on the edges; beak long. . . . 12. *P. lacerata,* Bonati.

Pedicularis tahaiensis, Bonati. Sp. nov. (Oliganthae).

Planta annua? (*Maire*). Radix? Caules basi glabri, summo plus minusve villosi, simplices, flexuosi, 15–30 cm. alti. Folia radicalia? Folia caulinaria pauca, alterna, quandoque quasi opposita, glabra, longe petiolata, pinnatisecta, 8–10 jugis loborum oblongorum vel linearium acutorum profunde pinnatifidorum; lobis triangularibus acutis mucronulatis; petiolis inferioribus 6–12 mm. longis superioribus fere nullis; limbo ovato, 15–20 mm. longo, circa 10 mm. lato; segmentis inferioribus brevissimis (circa 2 mm.) sparsissimis quandoque breviter petiolulatis; segmentis mediis 3–6 mm. longis, 1–2 mm. latis. Bracteae foliiformes sessiles, pinnatisectae floribus breviores. Flores sessiles, inferiores axillares sparsissimi superiores in spicis terminalibus paucifloris. Calyx villosissimus albidus trichomis elongatis dense tectus 5–7 mm. longus, antice fissus, dentibus duobus constrictis ac basi petiolulatis summo flabellatis profunde acutidenticulatis 1–1.5 mm. longis. Corolla rosea, circa 20 mm. longa, tubo cylindrico recto extus villosissimo intus glabro erecto calycem longe superante, 12–16 mm. longo; galea glabra, in parte inferiore erecta, 5–6 mm. longa, in parte horizontali 4–5 mm. longa, recta, cum crista magna addita et abrupte contracta in apicem filiformem decumbentem rectum vel paulo arcuatum circa 4 mm. longum summo profunde bifidum, fauce marginis inferioris dentibus duobus acutis ac retrorsis addita (quod est ad basin galeae); labio inferiore superius aequante, margine glabro, lobo medio lateralibus longiore ac angustiore. Staminum filamentis duobus villosis. Capsula ac semina?

Eastern Yunnan:—"Pedicularis annuel; fl. roses. Pâturages, plateau de Ta-hai. Alt. 3,200 m. Juillet 1913." E. E. Maire. No. 678.

A plant easily recognisable in the series of the *Oliganthae* by the form of its leaves and by the tube of its corolla densely covered with long trichomes.

Pedicularis laktangensis, Bonati. Sp. nov. (Oliganthae).

Rhizoma horizontale, breve, squamis lanceolato-linearibus 15–20 mm. longis tectum, quae e basi desiccato petiolorum oriri videntur. Radices fusiformes elongatissimae 8–10 cm. longae, radiculis filiformibus. Caulis simplex erectus basi glaber summo villosus cylindricus fistulosus, 25–30 cm. altus, paulo foliosus. Folia radicalia glabra, multa, longe petiolata; petiolis 30–45 mm. longis planis ac stricte alatis; limbo 8–12 cm. longo, 20–30 mm. lato, bipinnatifido; 12–15 jugorum lobis alternis basi decurrentibus profunde incisis, lobulis acutidentatis ac mucronatis. Folia caulinaria rara (4–6) radicalibus similia, sed minus profunde secta subsessilia. Flores axillares pedunculati singuli ac basi sparsi, summo in uvam spiciformem multifloram valde densam erectam conferti, pedunculis erectis filiformibus 2–3 mm. longis villosis. Calyx 6–7 mm. longus glabrescens membranaceus antice profunde in spatham fissus, dentibus 3 inaequalibus, dente summo breviore subulato integro lateralibus basi constrictis apice flabellatis 2–3 mm. longis quandoque apice bilobulatis. Corolla albo-rosea; tubo 7–8 mm. longo cylindrico summo non dilatato extus villoso ac intus ad insertionem staminum; galea non cristata glabra, in parte verticali erecta, 3–4 mm. longa, tubum recte sequente, in parte anteriore obtusangulatim curvata et erecta, 3–4 mm. longa et abrupte contracta in apicem falciformem lineatum 7–8 mm. longum plus minusve erectum; labio inferiore obscure trilobato, lobis ovato-obtusis longe ac dense margine ciliatis, medio breviore ac cucullato a latere compresso basi subcordato. Stamina ad summum ovarii inserta; filamentis omnibus glabris. Capsula ovata, glabra, 10–12 mm. longa, breviter apiculata. Semina ovata, paulo summo attenuata, in longitudine valde striata summo ac basi reticulata, circa 3 mm. longa, 1–2 mm. lata.

"Upper Burma :—Laktang. On steep grassy slopes facing south, often with No. 3253. Also on the granite ridge beneath bamboos on the more open saddles. Lat. 26° 10′ N. Long. 98° E. Alt. 9–10,000 ft. Visited by bees. Flowers pale pink, the horn darker, stems pale green without any red in it as in No. 3253. June 1919." F. Kingdon Ward. No. 3293.

9168 **Pedicularis quadrata,** Bonati. Sp. nov. (Oliganthae).

Perennis. Rhizoma horizontale crassum, squamis ovatis acutis tectum; radiculis crassis lineatis elongatis. Caules breves 12–15 cm. alti simplices cylindrici villosi erecti paulo foliosi. Folia alterna; radicalia multa villosa cinerea crassa; petiolis

circa 2 cm. longis stricte alatis; limbo 30-35 mm. longo lineato-lanceolato basi attenuato profunde pinnatifido raro pinnatisecto; 10-12 jugis loborum; lobis oblongis pinnatilobulatis; lobulis obtusis. Bracteae inferiores foliiformes petiolatae; superiores ovatae petiolatae integrae vel vix incisae calycem aequantes vel superantes. Flores in uva terminali 5-7 cm. longa basi interrupta summo plus minusve compacta; flores inferiores longe pedunculati; pedunculis erectis filiformibus villosis circa 1 cm. longis; flores superiores subsessiles. Calyx cylindricus griseus trichomis tectus circa 1 cm. longus usque ad medium antice fissus crassus; lobis 5 subaequalibus 2-3 mm. longis omnibus obscure lobulatis. Corolla purpurea; tubo calycem aequante cylindrico paulo arcuato glabro; galea paulo villosa falcata (crista valde proeminente ac elongatissima) abrupte contracta in apicem filiformem semiorbicularem vel sigmoideum, galeam aequantem, in margine inferiore bidentata; labio inferiore superius aequante margine glabro superficialiter trilobato, lobis subaequalibus. Stamina ad basin tubi corollae inserta; filamentis 2 villosis in parte inferiore et media. Capsula et semina?

"S.E. Tibet :—Precipices, alpine turf, etc., Ka-gwr-pw. Alt. 15,500 ft. July 1913." F. Kingdon Ward. No. 812. (Mixed with *P. Elaesii*, Hook f. and *P. praeruptorum*, Bonati.)

A plant having some affinities with the species of the series of *Robustae* of Prain in view of the staminal insertion towards the lower third of the tube of the corolla. It is separated however from all the species of this group by its hood furnished with a very developed crest and its beak not bifid. It has also affinities with the group of the *Oxycarpae*, among which its nearest relative appears to be *P. tibetica*, Franch. It differs from the latter by its robust appearance, its flowers with long upright peduncles and by its larger corolla whose tube does not exceed the calyx. Its true position appears to be in the group of the *Oliganthae* of Prain.

Pedicularis tachanensis, Bonati. Sp. nov. (Oliganthae).

Rhizoma verticale breve. Radices fusiformes elongatae simplices. Caules ascendentes simplices basi glabri plus minusve dense pilis fuscis summo tecti paulo foliosi. Folia radicalia multa longissime petiolata; petiolis 3–6 cm. longis basi dilatatis ac anguste alatis paulo villosis raro glabrescentibus; limbo lineato-lanceolato obtuso 4–6 cm. longo circa 1 cm. lato pinnatisecto; 15–20 jugis loborum ovato-oblongorum sessilium; lobis ovato-oblongis profunde pinnatifidis 4–6 cm. longis 28–35 mm. latis, lobulis acutidentatis. Folia caulinaria radicalibus similia sed brevius petiolata lobis stricte linearibus simpliciter dentatis;

petiolis basi dilatatis ac margine pilis fuscis ciliatis. Bracteae floribus breviores; inferiores foliiformes, breviter petiolatae, lobis subfiliformibus; superiores pinnatilobatae, lobis obtusis. Flores in uvis terminalibus spiciformibus dispositi, pedunculis 2–3 mm. longis erectis. Calyx membranaceus circa 6 mm. longus; tubo cylindrico antice fisso lobis 2 basi filiformibus summo flabellatis circa 1 mm. longis. Corolla rosea circa 2 cm. longa; tubo cylindrico recto calycem hemiolion superante extus glabro intus ad staminum insertionem villoso; galea in parte inferiore saepius retroversa circa 1 cm. longa rectangulatim curvata; in parte horizontali 6 7 mm. longa valde proeminenter cristata; crista dorso villosa et in apicem filiformem 5 mm. longum finita; margine dente uno, latere quoque refracto; labio inferiore superius paulo superante haud profunde trilobato margine ciliato. Stamina ad trientem tubi corollae inserta; filamentis omnibus glabris. Capsula glabra 10 15 mm. longa breviter mucronata. Semina ovoidea apiculata 2 mm. longa, circa 1 mm. lata in longitudine ad faciem ventralem striata.

East Yunnan:—"Marécages du plateau de Ta-chan. Alt. 2200 m. Pedicularis vivace; fl. roses. Août 1914." E. E. Maire. No. 182.

1537 **Pedicularis strobilacea,** Franch., var. **riparia,** Bonati. Var. nov.

Planta primo conspectu *P. strobilaceae,* Franch. similis. Annua vel biennis. Radix cum palo verticali cylindrico; radiculis filiformibus. Caulis erectus e basi ramosus in maxima parte glaber summo pubescens, ramis flexuosis non ramificatis caulem aequantibus. Folia inferiora quandoque opposita, superiora omnia alterna; omnia longissime petiolata; petiolis patulis stricte alatis 15–25 mm. longis; limbo paulo villoso ovato-oblongo 2–3 cm. longo, circa 15 mm. lato, profunde pinnatifido vel saepius pinnatisecto; 3–7 jugis loborum pinnatilobulatorum; lobulis integris obtusis acutidentatis. Bracteae foliiformes sed sessiles ac basi membranaceae cuneatae. Flores subsessiles, summo caulium ac ramorum glomerati in uvis spiciformibus brevibus densis, sicut apud *P. strobilaceam,* Franch., *P. cephalantham,* Franch., etc.; pedunculis circa 1 mm. longis. Calyx membranaceus 8–10 mm. longus antice fissus usque ad trientem; dentibus 5 foliaceis sessilibus flabellatis 1 mm. longis profunde lobulatis; lobulis ovato-obtusis mucronatis; tubi nervis 5 reticulatis. Corolla luteola; galea rubra; tubo calycem aequante cylindrico lato extus villoso; galea erecta, in parte verticali brevi (circa 5 mm.) dorso falciformi rugoso circa 6 mm. longo cristato abrupte in apicem filiformem erectum vel paulo curvatum 6 mm.

longum contracto; labio inferiore superius aequante orbiculari margine ciliato haud profunde trilobato, lobo medio lateralibus multo minore obtuso 3 mm. longo ac lato. Staminum filamenta fauce inserta, quorum duo dense villosa. Capsula ac semina?

"West China :—N.W. Yunnan. By streams in forest. Alt. 10–11,000 ft. July 1913." F. Kingdon Ward. No. 683.

"Mekong-Salween divide, Yunnan, in alpine meadows. Lat. 28° 12′ N. Alt. 13,000 ft. Plant of 9–12 ins. Flowers white or pale rose, beak deep crimson. July 1917." G. Forrest. Nos. 14,367, 14,581.

A plant similar to *P. strobilacea,* Franch., to which I have attached it as a variety, and whose position appears to be doubtful in spite of its having the stamens inserted on the throat. It differs from *P. strobilacea,* Franch. by its 5-toothed calyx, short corolla tube and the beak straight or scarcely arched and much longer; there are no teeth on the lower edge of the hood. If the figure given by Maximowicz is correct it is easy to distinguish at a glance var. *riparia,* Bonati from *P. strobilacea,* Franch. In var. *riparia* two staminal filaments are densely hairy, the two others are less so, but they are not glabrous; the hood has a very different shape in the two plants.

Pedicularis cephalantha, Franch., var. **szetchuanica,** Bonati.

Var. nov.

Differs from the type by :—

The stems shaggy with hairs red at the tips; the leaves with petioles relatively longer and with the lobes broader (10–12 pairs of lobes 8 mm. long, 4–5 mm. broad); the membranous bracts dilated and long-ciliated at the base; the calyx invariably with two teeth lanceolate-acute pinnatilobate with lobes obtuse and not numerous and with tube membranous and yellowish, deeply cleft in front, 7–8 mm. long; the tube of the corolla 13–14 mm. long; the hood not hairy on the back, but simply glandular less abruptly contracted into a beak about 5 mm. long, slightly bifid at the extremity. As in the type two of the staminal filaments are hairy and the lower lip is glabrous.

West China :—"Szetchuen austr. inter Hunka et Woloho in pratis. Alt. 3000 m. Jun. 1915." Camillo Schneider; Iter chinense, 1914, societatis dendrologicae Austriae et Hungariae. No. 1516.

"Inter Woloho et Humati in pratis mont. Alt. 2800 m. Jun. 1915." C. Schneider. No. 3763.

By the form of its calyx the above plant approaches *P. oligantha,* Franch. and *P. longepetiolata,* Franch. but *P. oligantha,* Franch. has the lower lip ciliate and the staminal filaments all

glabrous and *P. longepetiolata,* Franch. has the lobes of the calyx deeply divided, the stem very long and very leafy, etc. Dr Handel-Mazzetti who took part in the Austro-Hungarian expedition and who lived for four years in Western China has called my attention to the fact that the lower edge of the hood of *P. cephalantha,* Franch. shows a tooth only on one side; I have myself often noted the same fact, but I have been able to convince myself that it is not absolutely constant.

Series Oliganthae.

A. Staminal filaments all glabrous.
Lower lip with ciliate edges; calyx with three teeth, that on the top entire . . . 1. *P. oligantha,* Franch.

B. At least two staminal filaments hairy.

*Staminal filaments all hairy.

+Lower lip glabrous.
Inflorescence a long raceme; calyx with 5 flabellate, more or less incised teeth; stem long, weak, hairy, woolly at the top . . . 2. *P. Margaritae,* Bonati.

++Lower lip ciliate on the edges.

△Hood with a crest.

±Flowers arranged in short spike-like racemes; calyx with two teeth; plant small, erect, with few leaves, glabrescent, at least at the base. Corolla rose. . . . . 3. *P. tachanensis,* Bonati.

±±Plant weak. Corolla yellow. Calyx with five lobes. . . . 4. *P. pseudocephalantha,* Bonati.

△△Hood without crest, on anterior side erect or ascending; inflorescence in long racemes, calyx with 3 lobes. . . . . 5. *P. laktangensis,* Bonati.

**Two staminal filaments hairy.

+Lower lip with edge glabrous.

△Hood with a crest.

±Calyx with five lobes, all obtusely lobulate; median lobe of the lower lip of the corolla dilated; leaves all alternate, fleshy; plant hairy, of ashy appearance. . . . . 6. *P. quadrata,* Bonati.

±±Calyx very hairy, with two teeth deeply incised. Tube of the corolla very hairy. . . . . 7. *P. tahaiensis,* Bonati.

△△Hood without crest.

±Hood hairy on the back sharply contracted into the long beak; calyx with five teeth of which two are subulate and entire, the other three lanceolate and serrate; lower leaves opposite. . . . .

. . . . S. *P. cephalantha,* Franch.
sometimes calyx with two teeth, hood less sharply contracted. . . 8A. *P. cephalantha,* var. *szetchuanica,* Bonati.

± ± Hood glabrous, gradually drawn out into long beak; calyx with five teeth, all incised. . . . .
. . . . 9. *P. longepetiolata,* Franch.

+ + Lower lip with edge ciliate.
Hood with a crest. Corolla yellow with hood red and sharply contracted into a straight or slightly incurved beak. 10. *P. strobilacea,* Franch. var. *riparia,* Bonati.

Pedicularis Monbeigiana, Bonati, var. **birmanica,** Bonati. Var. nov.

Differs from the type by its smaller flowers with glabrous calyx. Only two staminal filaments are hairy.

"Upper Burma :—Summit of the Sansi gorge, in open pasture. Lat. 25° 25′ N. Alt. 9,500 ft. Plant of 18 ins. Flowers bright rose. Sept. 1912." G. Forrest, No. 9146.

Pedicularis kariensis, Bonati. Sp. nov. (Polyphyllatae).

Planta perennis nana 7–8 cm. alta. Radices fusiformes elongatissimae. Caulis validus flexuosus ramosus angulosus laneus. Folia radicalia caduca; caulinaria pauca petiolata; petiolis alatis villosis circa 1 mm. longis, limbo ovato-oblongo profunde bipinnatifido, 25–30 mm. longo, circiter 15 mm. lato; jugis 3–4 loborum alternorum ac profunde acutidentatorum. Flores axillares pedunculati, summo caulium ac ramorum velut in caput conjuncti; pedunculis brevibus (1–2 mm.). Calyx cylindricus antice vix fissus membranaceus, nervis primariis 5 eminentibus ac nervis secundariis 10 anastomosantibus et arcte reticulatis; lobis 5, 3–4 mm. longis, basi constrictis ac stipitatis, lobo medio subfiliformi integro vel vix inciso, lobis lateralibus summo dilatatis pinnatisectis segmentis linearibus acutis. Corolla magna, acerrime rosea; tubo arcuato, 15–17 mm. longo, summo dilatato extus glabro intus ad staminum insertionem villoso; galea in parte inferiore tubum aequante ac recte sequente, tergo falciformi, glabro ac abrupte in rostrum rectum filiforme (circiter 5 mm. long.), acumine vix scissum contracto; inferiore galeae margine ab utroque latere dente acuto munito. Labium inferius maximum margine ciliatum, 20 mm. longum, 25 mm. latum, superficialiter trilobatum, lobo medio proeminente suborbiculari, lateralibus multo latioribus et orbiculatis. Stamina

ad tubi basim inserta, filamentis omnibus villosis. Antherae summo truncatae, loculis abrupte ac breviter apiculatis.

"West China :—Open, moist stony pasture on the Kari Pass, Mekong-Yangtze divide. Lat. 27°40′N. Alt. 13,000 ft. Plant of 2–3 ins. Flowers deep rose. August 1914." G. Forrest. No. 13,070.

A plant allied to *P. Stadlmanniana,* Bonati, but more robust, with much larger corolla, with tube much longer than the calyx and with hood glabrous on the back; the peduncles are much shorter and the lobes of the calyx recall those of the calyx of *P. batangensis,* Bur. et Franch.

Series Polyphyllatae. (*Sensu stricto*).

A. Lower lip glabrous; hood glabrous; calyx not split in front but with five equal flabellate sessile or subsessile teeth; filaments all hairy. . . . 1. *P. gruina,* Franch.

B. Lower lip more or less densely ciliate on the edges; calyx more or less deeply cut in front.

*Teeth of calyx dissimilar, that at the top entire, lanceolate, acute, subfiliform, the latter ones stipitate, dilated at the top, pinnatisect; staminal filaments all hairy. Hood glabrous. Peduncles very short. 2. *P. kariensis* Bonati.

**Teeth of the calyx all similar incised. Hood hairy on back.

+Lobes of calyx triangular, acute, stipitate, peduncles long, up to 20 mm.; plant with slender stem and diffuse branches. . . . 3. *P. Stadlmanniana,* Bonati.

++Lobes of calyx flabellate, sessile or subsessile, plant robust.

△Peduncles very long, spread out or reflexed, 20-35 mm. long, shaggy. . . . 4. *P. polyphylloides,* Bonati.

△△Peduncles short not exceeding 5–10 mm. erect. . . . . 5. *P. polyphylla,* Franch.

Pedicularis birmanica, Bonati. Sp. nov. (Pectinatae).

Rhizoma verticale fusiforme elongatum; radiculis filiformibus plus minusve ramosis. Caulis circa 15 cm. altus ramosissimus, ramis ascendentibus vel patulis, summo villosus basi glabrescens angulosus erectus vel plus minusve flexuosus. Folia sessilia basi truncata, inferiora opposita, superiora 3-verticillata, omnia ovato-oblonga, 20–30 mm. longa, 7–10 mm. lata, pinnatifida, 4–5 jugis segmentorum lineato-obtusorum et obtuse denticulatorum. Bracteae sessiles, foliiformes, sed basi membranaceae. Flores sessiles, inferiores axillares sparsi, superiores summo caulium in spicis densibus brevibus conicis conjuncti. Calyx villosus

campanulatus, circa 8 mm. longus, dentibus 5 longis 2 mm.; dente summo integro lanceolato-acuto; lateralibus basi constrictis late dilatatis ac summo obscure lobatis margine ciliatis; tubo membranaceo perlucido, nervis 10 non reticulatis. Corolla purpureo-splendens, circa 20 mm. longa; tubo cylindrico glabro circa 12 mm. longo, recto, calyce duplo longiore; galea non cristata, tubo duplo breviore, in parte verticali 3 mm. longa, dorso rotundo, in parte horizontali 3 mm. longa, abrupte contracta in apicem 8–10 mm. longum rectum vel paulo arcuatum; labio inferiore apicem aequante margine ciliato, lobo medio obtuso concavo brevi lateralibus paulo longiore. Stamina medio tubi inserta; filamentis omnibus glabris. Capsula ac semina?

"Upper Burma :—Paijawng Bum. On open meadows facing grassy slopes at the summit. Lat. 26°10′N. Long. 98°30′E. Alt. 12–13,000 ft. Flowers bright crimson. July 1919." F. Kingdon Ward. No. 3441.

A plant belonging to the series *Pectinatae* and nearly allied by its floral characters to *P. ramosissima,* Bonati. It differs from this species by its hood having no crest and by its corolla tube twice as long as the calyx. Moreover its leaves are sessile and verticillate in threes.

Pedicularis praealta, Bonati. Sp. nov. (Pectinatae).

Planta valde affinis *P. alopecuros,* Franch., a qua differt :—(1) caulibus robustis erectis 1 m. altis, summo plus minusve ramosis, paulo villosis vel glabrescentibus; (2) foliis omnibus longe petiolatis, generaliter 4-verticillatis; petiolis 10–15 mm. longis; limbo pingui inferne villosissimo praesertim ad nervos, 30–40 mm. longo, ovato-oblongo, summo attenuato, profunde pinnatifido, 7–10 jugis loborum lanceolato-obtusorum; (3) inflorescentia in spicis longioribus (5–12 cm.) minus densis ac basi plus minusve interruptis; (4) bracteis non imbricatis calycem non superantibus, superioribus basi attenuatis ac membranaceis; (5) calyce villosissimo, lobis 5 aequalibus ac omnibus profunde acutidentatis ovato-oblongis obtusis circa 1 mm. longis; tubi calycini nervis primariis 10 summo reticulatis; (6) tubo corollae calycem duplo superante, intus ad insertionem staminum villoso; galea simili *P. alopecuros,* Franch. sed apice breviore ac falciformi 4–5 mm. longo; labio inferiore quam superius breviore glabro; staminum filamentis glabris; antherarum loculamentis obtusis; capsula calycem paulo superante ovoidea apiculata, apice breviter ac paulo lateraliter ejecto, 8 mm. longa, 5 mm. lata, glabra; seminibus paucis circ. 8, ovoideis in longitudine striatis ac tenuissime reticulatis, circa 2 mm. longis ac 1 mm. latis.

Eastern Yunnan :—"Plateau herbeux de Ié-ma-tchouan. Alt.

3,200 m. Pedicularis annuel, haut. 1 m.; fl. jaunes. Août." E. E. Maire. No. 673.

Pedicularis dichotoma, Bonati, var. **Wardiana,** Bonati. Var. nov.

Differs from the type described in 1908 (Bull. Soc. Bot. Fr. lv, 247) :—(1) by the calyx split in front to a third of its length; (2) by the lobes of the calyx being shorter and not exceeding the fourth or fifth of the length of the tube; (3) by the hood sharply contracted into the long and linear beak; (4) by the lower lip of the corolla having its edge glabrous or with very few hairs.

N.W. Yunnan :—A-tun-tsu. Alt. 11–13,000 ft. Aug. 1913. F. Kingdon Ward. Nos. 950, 1070.

Series Pectinatae.

A. Calyx with teeth all entire.
  *Staminal filaments all hairy.
    +Lower lip glabrous.
      △Tube of the corolla equalling the calyx. Stamens inserted at the base of the corolla tube and in an enlargement of it in the form of a sack.
        ±Corolla rose; flowers arranged in an interrupted spike. . . . . 1. *P. pectinata,* Wall.
        ± ±Corolla yellow; flowers arranged in dense not interrupted spikes. . . 2. *P. tenuirostris,* Benth.
      △△Tube of the corolla 1½ times as long as the calyx; stamens inserted at the middle of the tube. . . . . 3. *P. pyramidata,* Royle.
    + +Lower lip ciliate, corolla purple, beak straight; leaves fleshy, pinnatisect, similar to those of *P. striata,* Pall. . . . . 4. *P. dichotoma,* Bonati.
  **At least two staminal filaments glabrous.
    +Two filaments glabrous; corolla yellow with hood red, lower lip with margin ciliate. 5. *P. Duclouxii,* Bonati.
    + +Staminal filaments all glabrous; lower lip ciliate, corolla purple. . . . 6. *P. pectinatiformis,* Bonati.
B. Calyx with teeth incised, or at least with lateral teeth incised.
  *Tooth at top of calyx entire.
    +Lower lip of the corolla with ciliate margin.
      △Hood with a crest; tube of the corolla not exceeding the calyx; flowers small. 7. *P. ramosissima,* Bonati.
    △△Hood without a crest.
      ±Corolla large 20 mm. with tube twice as long as the

calyx, about 10 mm.; lower part of the hood very short; leaves sessile verticillate in threes. . . . . 8. *P. birmanica,* Bonati.

± ± Calyx very small 2–2½ mm.; lower part of the hood as long as the tube; leaves with long petioles. . . . . 9. *P. atuntsiensis,* Bonati.

+ + Lower lip of the corolla glabrous.

△ Hood with a crest. Lower lip shorter than the upper; lateral teeth of the calyx little divided. . . . . 10. *P. Fetisowii,* Regel.

△△ Hood without crest; lower lip as long as the beak; lateral teeth of the calyx deeply incised; beak straight.

± Stem slender; leaves membranous with long petioles verticilate in fours; lower part of the hood as long as the tube. . . 11. *P. Smithiana,* Bonati.

± ± Stem robust; leaves fleshy, subsessile, usually opposite; lower part of the hood very short, almost none. . . . . 12. *P. alopecuros,* Franch.

** Teeth of calyx all incised.

Lower lip shorter than the upper; tube of the corolla twice as long as the calyx, beak falciform. . . . . 13. *P. praealta,* Bonati.

Pedicularis Handel-Mazzettii, Bonati. Sp. nov. (Debiles).

Perennis. Rhizoma verticale squamis nonnullis linearibus obtusis tectum. Radices fusiformes aut lineares, paulo ramosae. Caules multi erecti vel adscendentes angulosi in sulcis lanati alibi glabri non ramosi, 5–9 cm. alti. Folia radicalia caduca. Caulinaria pauca glabrescentia; inferiora petiolata ovata oblonga profunde pinnatipartita, lobis 5–7 ovatis obtusis acutidentatis; petiolis 5–6 mm. longis; limbo 7–8 mm. longo, circa 4 mm. lato, lobis 2–3 mm. longis, circa 1 mm. latis. Folia caulinaria media subsessilia vel sessilia, basi membranacea, 5–6 mm. longa, 3–4 mm. lata, ovato-obtusa acutidentata. Bracteae membranaceae basi dilatatae summo foliaceae ac palmatilobatae. Flores subsessiles, summo caulis in racemis spiciformibus spissis ac brevibus conjuncti. Calyx brevis, 5–6 mm. longus, membranaceus, in nervis et in marginibus villosus, vesiculosus, costis 5 eminentibus et lobis 5; summo lobo integro lanceolato-acuto; lobis lateralibus flabellatis ac profunde incisis. Corolla rosea; tubo cylindrico recto circiter 10 mm. longo summo villoso; galea in parte inferiore tubum aequante ac erecta; in parte superiore recto angulo geniculata et in rostrum filiforme 5–6 mm. longum rectum vel vix arcuatum obscure attenuata; labio inferiore rostrum aequante, in marginibus spisse ciliato, lobo medio minimo ac laterales vix

superante. Staminum filamenta omnia villosa, ad summum corollae tubi inserta. Antherae summo truncatae loculamentis obtusis. Capsula paulum calycem superans longe apiculata. Semina parva circa 1.5 mm. longa cinerea arcuata apiculata valde reticulata.

"West China :—Stony, moist pasture on the mountains of the Chungtien Plateau, Yunnan. Lat. 27°55′N. Alt. 12,000 ft. Plant of 2–3 ins. Flowers rose. August 1913." G. Forrest. No. 10,776.

A plant allied to *P. verbenaefolia,* Franch. and especially to the variety *minor* of this species (Maximowicz, Diag. Pl. Nov. Asiat. vii, p. 818.) It differs from the plant described by Franchet; (1) by the tube of the corolla being hairy at the top; (2) by the staminal filaments being all hairy.

The series of the *Debiles* now contains 9 species which can be classified as follows.

Series Debiles.

A. Leaves lanceolate, much longer than broad. Lower lip and staminal filaments glabrous.
  a. Bracts pinnatipartite; lower lip angular with polygonal outline, shorter than the beak. . . 1. *P. Heydei,* Prain.
  b. Bracts palmatipartite; lower lip with rounded outline, as long as the beak. . . 2. *P. Pheulpini,* Bonati.

B. Leaves oval.
  a. Sepals entire or very rarely bifid; staminal filaments and lip glabrous. . . . 3. *P. nudicaulis,* Bonati.
  b. Lateral sepals incised.
  *Lateral sepals serrate.
    + Staminal filaments all glabrous. 4. *P. porrecta,* Wall.
  + + Two staminal filaments hairy. 5. *P. villosula,* Franch.
  **Lateral sepals palmatilobed or palmatifid.
    + Lower lip with ciliate edge.
      ± Staminal filaments glabrous. 6. *P. debilis,* Franch.
    ± ± At least two staminal filaments hairy.
      △ Two filaments hairy, tube of the corolla glabrous. . . . . 7. *P. verbenaefolia,* Franch.
      △△ All the filaments hairy; tube of the corolla hairy on the upper part. 8. *P. Handel-Mazzettii,* Bonati.
  + + Lower lip with glabrous edge; staminal filaments glabrous . . . . . 9. *P. confertiflora,* Prain.

7206 **Pedicularis Pantlingii,** Prain., var. **chimiliensis,** Bonati. Var. nov.

This plant has the appearance of *Pedicularis Pantlingii,* Prain

but is smaller in all its parts as indicated in the following table. It differs from the type species :—(1) by its shaggy calyx, not split in front, with lobes subequal, all incised; (2) by its hood gibbous in front and sharply contracted into the beak which is filiform, very long, truncate, and bifid in front, with angular lobes; the back covered with very short glandular hairs as in the type; (3) by the lower lip completely glabrous, with median lobe asymmetric, triangular, acute.

The staminal filaments are inserted on the middle of the tube of the corolla as in the type; two of these are perfectly glabrous, the other two being very slightly hairy.

	P. Pantlingii type.	*P. Pantlingii*, var. *chimiliensis*.
Stem	from 40–60 cm.	from 30–35 cm.
Petiole	2.5–6 cm.	2.5–5 cm.
Lamina of leaf	2.5×2.5—5×4.5 cm.	2.5×2.5—3×3 cm.
Lobes of leaf	5 mm.×9 mm.	5 mm.×9 mm.
Peduncles	0–3 mm.	3–8 mm.
Calyx	8 mm.	5 mm.
Tube of corolla	8 mm.	5 mm.
Lower part of hood	4 mm.	3 mm.
Anther-bearing part	5 mm.×3 mm.	4 mm.×2 mm.
Beak	5 mm.	5 mm.
Lower lip	17 mm.	10 mm.
Capsule	20 mm.	15 mm.
Seed	2 mm.	?

"Upper Burma :—Chimili Woods. Alt. 10,000 ft. In opener places of the alpine woodland. July 1919." R. Farrer. No. 1143.

7519

Pedicularis praeruptorum, Bonati. Sp. nov. (Rhyncholophae alternifoliae e serie Paucifoliatarum, Prain).

Planta nana 5–8 cm. alta. Rhizoma verticale breve truncatum, radiculis crassis fusiformibus elongatis. Caulis solitarius simplex vel raro ramosus paulo foliosus plus minusve villosus basi squamis membranaceis lanceolatis obtusis basi dilatatis tectus. Folia lanceolato-linearia fere omnia radicalia alterna petiolata, 2–4 cm. longa; petiolis limbum aequantibus; limbo crasso supra glabro inferne villoso-lanato pinnatisecto; 6–10 jugis loborum oblongo-obtusorum pinnatilobulatorum; lobulis obtusis. Folia caulinaria 1–2 radicalibus similia sed breviora ac brevius petiolata. Bracteae inferiores foliiformes subsessiles; superiores cuneatae basi membranaceae dilatatae calycem aequantes. Flores ad summum caulis aggregati in cymis 6–8-floris. Pedunculi erecti vel patuli plus minusve villosi foliiformes 3–5 mm. longi. Calyx cylindricus circa 5 mm. longus antice non fissus dentibus 5 circa 1 mm. longis; dente superiore integro, lateralibus basi filiformibus summo foliaceis plus minusve incisis. Corolla purpurea, tubo cylindrico summo paulo dilatato et caly-

cem paulo superante; galea rectangulatim curvata, in parte verticali erecta et tubum aequante; in parte horizontali 3–4 mm. longa, non cristata lente attenuata in apicem rectum vel vix arcuatum plus minusve obliquum circa 4–5 mm. longum; labio inferiore superius aequante lato patulo margine dense ciliato breviter trilobato, lobis orbicularibus subaequalibus. Stamina ad medium tubi inserta; filamentis omnibus glabris. Capsula ac semina?

"S.E. Tibet :—On precipices, alpine turf, etc. at Ka-gwr-pw. Alt. 15,500 ft. July 1913." F. Kingdon Ward. No. 812. *pro parte* mixed with *P. Elwesii,* Hook f. and *P. quadrata,* Bonati.

This plant, allied to *P. yunnanensis,* Franch., has some analogies with *P. filicula,* Franch. and *P. Potanini,* Maxim. of the allied series *Caespitosa.* It differs from *P. filicula,* Franch. by (1) its radical leaves less numerous and with longer petioles; (2) its inflorescence in very short racemes; (3) its staminal filaments all glabrous. It differs from *P. Potanini,* Maxim. by (1) its inflorescence; (2) its small purple corolla (not yellow like that of *P. Potanini,* Maxim.); (3) the lower lip of the corolla being ciliate; (4) the staminal filaments glabrous.

Pedicularis nobilis, Bonati Sp. nov. (Paucifoliatae).

Planta perennis, multicaulis. Rhizoma et radices? Caules glabrescentes erecti vel ascendentes. Folia radicalia multa longe petiolata pinnatipartita, 8-9 jugis loborum triangulatorum obtusorum, basi latorum ac decurrentium profunde lobulatorum, lobulis obtusis; lobis inferioribus multo minoribus; petiolis 30–35 mm. longis compressis stricte alatis; limbo 35–65 mm. longo 15–20 mm. lato. Folia caulinaria alterna vel rarissime opposita radicalibus similia sed brevius petiolata, lobulis acutidentatis. Bracteae sessiles basi membranaceae, dilatatae ovato-oblongae pinnatilobatae floribus breviores. Flores multi magni elegantissimi breviter pedunculati, inferiores axillares sparsi, superiores in cymis terminalibus paucifloris; pedunculis 3–4 mm. longis erectis. Calyx villosus campanulatus circa 10 mm. longus membranaceus antice non fissus, lobis 5 subaequalibus basi constrictis et petiolulatis omnibus ovato-obtusis summo foliaceis ac incisis, 2–3 mm. longis, nervis 10 non reticulatis. Corolla 25–28 mm. longa purpureo-splendens raro alba extus glabra; tubo cylindrico extus glabro vel trichomis raris munito, ab ore calycis arcuato, calycem duplo superante, 3–4 mm. lato, summo paulo dilatato, intus ad insertionem staminum villoso; galea glabra maxima angulosa latissima in parte posteriore erecta, 5 mm. longa, in anteriore 10 mm. longa, 5 mm. lata; crista minima summo rectangulatim curvata et abrupte constricta in

apicem brevissimum, 2–3 mm. longum, decumbentem, summo lineatum ac bifidum; margine galeae dentibus 2 obtusis instructo; labio inferiore superius aequante basi breviter stipitato maximo, 10–12 mm. longo, 15 16 mm. lato; margine profunde denticulato paulo vel non ciliato; lobo medio lateralibus multo minore suborbiculare. Staminum filamenta omnia dense villosa. Capsula ac semina?

"Upper Burma :—Imaw Bum. Alt. 13,000 ft. In meadow pockets on the N. face of the mountain with *Cremanthodium, Potentilla, Primula*, etc. Flowers bright crimson—two white specimens were also found. July 1919." F. Kingdon Ward. No. 3399.

"Upper Burma :—Chimili Alps. Alt. 12,500 ft. Common on cliffs and broken ground in the high alpine lawns. August 1919." R. Farrer. No. 1200.

A very elegant plant allied to *P. filicula*, Franch. and *P. Forrestiana*, Bonati. It differs from the first, though it has the same angular hood and short beak, by (1) its much larger flowers; (2) its filaments all hairy. It differs from *P. Forrestiana*, Bonati by (1) the form of the calyx; (2) the lower lip slightly or not at all hairy; (3) the staminal filaments very hairy; (4) the very different form of the hood.

The series of the *Paucifoliatae*, Prain contains at present 6 species which can be distinguished by the following key.

Series Paucifoliatae.

A. Lower lip of the corolla ciliate.
  *Filaments all glabrous.
    Dwarf plant with stem robust, erect, 5–8 cm. high; flowers in a head; tube of the corolla scarcely exceeding the calyx. . . . . 1. *P. praeruptorum*, Bonati.
  **At least two staminal filaments hairy; tube of the corolla twice as long as the calyx.
    +Two staminal filaments hairy; stem with few or no leaves. . . . . 2. *P. yunnanensis*, Franch.
    ++All the staminal filaments laxly hairy; cauline leaves numerous. . . . . 3. *P. Forrestiana*, Bonati.

B. Lower lip of the corolla glabrous.
  *Two staminal filaments hairy; plant robust. . . . . 4. *P. tsangchanensis*, Franch.
  **All the staminal filaments hairy.
    △Lower lip of the corolla with denticulate margin; hood angular, sharply contracted into the beak which is short and bifid at the top. Flowers very numerous. . . . . 5. *P. nobilis*, Bonati.

△△Lower lip of the corolla not emarginate, entire; tube of the corolla twice as long as the calyx; hood not angular gradually merging into the short beak. Plant with few flowers, flowers small. . 6. *P. Wallichii,* Bunge.

Pedicularis tongtchouanensis, Bonati. Sp. nov. (Racemosae).

Planta perennis. Radix? Caules erecti glabri basi cylindrici, summo plus minusve angulosi, paulo foliati. Folia radicalia rosulata ex *Maire*. Folia caulinaria alterna breviter petiolata lanceolata obtusa in marginibus tenuiter ac leviter pinnatisecta omnino glabra basi cuneiformia, petiolis 2–5 mm. longis, limbo 30–60 mm. longo, 5–15 mm. lato. Bracteae filiformes sessiles; superiores lineares serratim dentatae floribus breviores. Flores inferiores subsessiles, superiores sessiles, in spicis terminalibus pauciflоris dispositi. Calyx crassus, 10–12 mm. longus cylindricus antice profunde fissus glaber; lobis duobus in marginibus inciso denticulatis, brevibus ac filiformiter (circa 1 mm. long.) mucronatis. Corolla alba dilute rosea, grandis, 30–35 mm. longa, tubo recto cylindrico summo paulo dilatato, 15–20 mm. longo, extus glabro; galea glabra, 10–15 mm. longa falciformi et in rostrum conicum ac obtusum attenuata (1–2 mm. long.). Labium inferius galeam aequans superficialiter trilobatum, lobo medio minimo, lobis lateralibus acuminatis ac omnibus pilis raris ciliatis. Stamina ad ovarii summum inserta, filamentis omnibus glabris; antheris oblongis, orbiculatis ac summo breviter scissis, loculamentis longe attenuatis ac breviter apiculatis. Capsula calyce duplo longior obliqua breviter rostrata. Semina ovata tuberculosa.

East Yunnan:—"Hautes montagnes à Tong-Tchouan. Alt. 3,200 m. Pedicularis vivace, feuilles de la base en rosette; fl. blanc lavé de rose. Sept." E. E. Maire *sine num.*

Plant closely allied to *P. nigra,* Vaniot, which grows in the same region. It differs from it by its middle and lower leaves being petiolate; by its dentate calyx lobes, by its glabrous staminal filaments, etc.

The series of *Racemosae* now contains 7 species which can be classified according to the following table.

Series Racemosae.

A. Calyx with segments entire.

a. Beak long.

*Hood sharply contracted into a long filiform beak. . . . . 1. *P. yezoensis,* Maxim.

**Hood gradually tapered.

+Lower lip ciliate. . . 2. *P. resupinata,* Linn.

++Lower lip glabrous. . . 3. *P. racemosa,* Dougl.
b. Beak short or very short.
*Plant glabrous, with lanceolate acute leaves; calyx glabrous. . . . . 4. *P. nigra,* Vaniot.
**Plant pubescent, with obtuse leaves, calyx hairy. . . . . 5. *P. Collettii,* Prain.
B. Calyx with segments incised or dentate.
*Beak long; corolla small, two filaments hairy; lower lip glabrous. . . . . 6. *P. lanceolata,* Michx.
**Beak very short; corolla very large, 35 mm.; upper bracts shorter than the flowers; staminal filaments glabrous; lower lip ciliate. . . 7. *P. tongtchouanensis,* Bonati.

Pedicularis galeata, Bonati. Sp. nov. (Tristes).

Rhizoma horizontale elongatum glabrum radicibus filiformibus plurimis et squamis membranaceis fuscis lanceolato-acutis 6–10 mm. longis tectum. Caules erecti solitarii simplices angulosi villosissimi. Folia radicalia? Caulinaria multa glabra sessilia basi truncata non auriculata ovato-obtusa, 35–40 mm. longa, circa 15 mm. lata, pinnatilobata, lobis ovato-obtusis acutidentatis, circa 2–3 mm. longis ac latis. Bracteae inferiores foliiformes, superiores rhomboidales, palmatilobatae floribus brevviores. Flores axillares pauci subsessiles, summo caulis in uvis spiciformibus brevibus ac basi interruptis conjuncti. Calyx membranaceus vesiculosus 8–10 mm. longus, dentibus 5 aequalibus pinnatilobulatis 5 mm. longis; nervis reticulatis. Corolla luteola; galea atro-purpurea fere nigra 20–25 mm. longa; tubo 1 cm. longo recto extus ac intus ad insertionem staminum villoso calycem aequante; galea circa 1 cm. longa, sicut in *P. tristi,* Linn., dorso rotundo ac paulo villoso antice clauso summo rotundo brevissime attenuato in apicem vix 1 mm. longum obtusum, margine glabro; labio inferiore galeam aequante vel paulo superante, margine ciliato, tripartito vel fere trisecto, lobis subaequalibus, medio ovato-obtuso, lateralibus linearibus forte arcuatis triangularibus summo obtusis. Stamina medio tubi corollae inserta glabra.

"West China :—Mekong-Salween divide, Yunnan. On open, stony pasture on ledges of cliffs. Lat. 28°12′N. Alt. 14,000 ft. Plant of 7–12 ins. Flowers, base yellowish, apex and beak deep black-crimson. August 1917." G. Forrest. No. 14,697.

Plant allied to *P. tristis,* Linn. from which it differs :—(1) by the form and membranous consistency of its leaves; (2) by its membranous calyx, very slightly hairy, with lobes broad, obtuse, and deeply incised; (3) by its hood with edge glabrous and with back very slightly hairy, whereas *P. tristis,* Linn. has the edge of the hood very hairy; (4) by the lower lip very deeply

lobed with ciliate edge while in *P. tristis* the lip is glabrous; (5) by the throat of the corolla being without the two very prominent ridges which are present in *P. tristis;* (6) by its stamens with anthers rounded at the top and with lobes long-tapered to a point while the stamens of *P. tristis* are cordiform at the top and have the lobes short and obtuse.

Series Tristes.

A. Species with hood terminating in a long beak.

a. Leaves all, or nearly all, radical, finely cut; beak long terminated by a pencil of hairs; lip small, tripartite. . . . . 1. *P. lachnoglossa,* Hook. f.

b. Stems leafy; beak not terminated by a pencil of hairs.

αBeak longer than the lower lip.

*Leaves crenate.

+ Hood hairy over its whole surface, lower lip tripartite.

△Corolla yellow; tomentum of hood bright yellow. . . . . 2. *P. lasiophrys,* Maxim.

△△Corolla white or rose; tomentum ash-coloured. . . . . 3. *P. cinerascens,* Franch.

+ + Hood hairy only on the edge; lower lip trifid. . . . . 4. *P. craspedotricha,* Maxim.

**Leaves pinnatisect.

+ Beak horizontal; corolla yellow. . . . . 5. *P. proboscidea,* Stev.

+ + Beak pendant; corolla red. 6. *P. recurva,* Maxim.

β Beak shorter than the lip or at the utmost as long as the lip.

*Hood with ciliate edge tapered into a broad and conical beak.

+ Leaves pinnati-partite; hood with back hairy; spike short and dense. . . 7. *P. Clarkei,* Hook. f.

+ + Leaves simply crenate; hood with back glabrescent, ciliate on the edges.

△Bracts exceeding the flowers in length; plants of very large size, hairy.

+ Filaments all hairy; teeth of calyx denticulate. . . . . 8. *P. ingens,* Maxim.

± ± Filaments all glabrous; teeth of calyx entire. . . . . 9. *P. pseudo-ingens,* Bonati.

△△Bracts equalling or scarcely exceeding the flowers. Plants glabrous. Teeth of calyx entire.

± Tube of the corolla twice as long as the calyx; edge of the hood furnished on each side with an obtuse extension; staminal filaments glabrous. . . . . 10. *P. tongolensis,* Franch.

± ± Tube of the corolla equalling the calyx; two staminal filaments hairy; edge of hood simple, lower lip denticulate. 11. *P. Steiningeri*, Bonati.

**Hood ending in a pendant beak; lower lip broadly reniform.

+ Calyx not split in front, with lobes short and entire; hood hairy only on the edge; two filaments hairy. . . . . 12. *P. brachystachys*, Bunge.

+ + Calyx split in front with teeth large and incised; hood entirely hairy.

△ Tube of the corolla slightly exceeding the calyx and bent at its exit from the latter; lower lip with lobes subequal; beak semi-circular. . . . . 13. *P. trichoglossa*, Hook. f.

△△ Tube of the corolla 1½ times as long as the calyx, not bent; lower lip with median lobe smaller than the lateral; beak scarcely arched. . . . . 14. *P. rhodotricha*, Maxim.

B. Species without beak.

a. Hood boat-shaped, open in front.

*Plant hairy or shaggy.

+ Tube of the corolla hairy on exterior.

△ Tube of the corolla equalling the calyx; teeth of the calyx lanceolate. . 15. *P. decora*, Franch.

△△ Tube of the corolla twice as long as the calyx; lobes of calyx obtuse. . . . 16. *P. rudis*, Maxim.

+ + Tube of the corolla glabrous on exterior.

△ Two staminal filaments glabrous, the two others hairy at the base; calyx with tooth at apex entire. . . . . 17. *P. acquibarbis*, Handel-Mazzetti.

△△ Filaments all glabrous.

± Calyx with teeth linear, acute, entire or obscurely denticulate; tube of the corolla twice as long as the calyx. Plant of large size (90 cm. or more). . . . . 18. *P. Dunniana*, Bonati.

± ± Calyx with teeth obtuse, deeply incised; tube of the corolla equalling or scarcely exceeding the calyx; plant from 40–45 cm. 19. *P. Prainiana*, Maxim.

**Plants glabrous or glabrescent; staminal filaments glabrous; lower lip ciliate.

+ Plant of very large size; hood bent, enlarged at the extremity. . . 20. *P. princeps*, Bur. et Franch.

+ + Plant of 30–40 cm. with angular stem; hood straight, upright, tapered and subacute at the extremity. . . . . 21. *P. dolichocymba*,* Handel-Mazzetti.

*=*P. tristiformis*, Bonati.

b. Hood closed in front.

*Radical leaves very large (20–30 cm.), pinnatisect. . . . . 22. *P. pteridifolia,* Bonati.

**Leaves all similar.

+ Lobes of calyx obtuse, deeply incised; edge of hood glabrous; lower lip hairy; anthers with acute lobes. . . . . 23. *P. galeata,* Bonati.

++ Lobes of calyx lanceolate-acute, entire or serrate; edge of hood hairy; anthers with obtuse lobes; throat with two ridges much developed. 24. *P. tristis,* Linn.

(753) **Pedicularis densipica,** Franch., var. **Schneideri,** Bonati. Var. nov.

This differs from *P. densispica,* Franch. by its taller habit, 40 cm. or more, its leaves verticillate in fours, patent or reflexed, 40–45 mm. long, about 20 mm. broad, its bracts much more elongate, patent or reflexed, two or three times as long as the flowers, its calyx with segments longer stalked and itself 10–12 mm. long, its corolla about 15 mm. long, and finally by its staminal filaments being all hairy.

West China :—"Yunnan, in pratis humidis inter Yung-peh-ting et Taowang; fls. rosei. Alt. 2,400 m. Jul. 1914." Camillo Schneider. No. 1710. Iter chinense, 1914, Societatis dendrologicae Austriae et Hungariae.

(754) **Pedicularis Wardii,** Bonati. Sp. nov. (Fragiles).

Planta nana. Rhizoma horizontale nodosum, internodiis squamis lineatis fuscis tectis; radiculis linearibus subfiliformibus elongatissimis (8–10 cm.). Caules multi ascendentes angulosi glabri basi sublignosi herbacei decumbentes summo ac plus minusve ramosi 6–10 cm. alti. Folia opposita petiolata glabra vel pilis raris ciliata; petiolis inferioribus 1–2 cm. longis, superioribus brevioribus (5–10 mm.), stricte alatis; limbo ovato pinnatisecto, loborum 5–6 jugis; lobis inferioribus petiolulatis, superioribus subsessilibus, inde sessilibus, omnibus ovato-oblongis obtusis plus minusve profunde pinnatilobulatis; lobulis acutidentatis. Bracteae foliiformes. Flores in axillis foliorum singuli pedunculati; pedunculis erectis deinde decumbentibus 1–2 mm. longis glabris. Calyx membranaceus perlucidus infundibuliformis circa 4 mm. longus antice non fissus margine ciliatus, dentibus 5 lanceolato-lineatis acutis circa 1 mm. longis glabrescentibus; nervis primariis 5 in medio loborum, secundariis 5 in intersectione loborum non reticulatis. Corolla albo-flava, tubo erecto cylindrico circa 8 mm. longo circa 2 mm. diametro, calycem duplo

superante, interne paulo villoso; galea falciformi, dorso glabra, tubum aequante, summo obtusa ac rotunda, margine solum inferne pilis raris ciliato; labio inferiore brevissimo (2–2.5 mm.), lineato margine ciliato usque ad medium in lobos 3 fisso; lobis lateralibus ovato-acutis planis, medio latiore obtuso rotundo ac concavo, fauce cristis 2 parallelibus maximis addito. Stamina ad basin tubi corollae inserta; filamentis omnibus glabris; antheris longe apiculatis.

"S.E. Tibet :—Ka-gwr-pw Temple. Abies forest. Alt. 15,000 ft. July 1913." F. Kingdon Ward. No. 881.

A dwarf plant belonging to the series *Fragiles* of Prain and a near ally of *P. Legendrei,* Bonati. It differs from that species by its small size, its stems sub-lignose at the base, its corolla yellow and hood glabrous on the back and scarcely ciliate on the edge, the lower lip very short, and finally by its staminal filaments being all glabrous. It differs from *P. Kingii,* Prain of which the corolla is white, by its calyx not split in front, by its filaments being glabrous and inserted at the base, by the form of its leaves, etc.

The series of the *Fragiles* of the section *Anodontae-verticillatae* now contains four species which can be easily distinguished by the following table.

A. Calyx split in front; corolla white, hood without beak and with glabrous edge; lower lip glabrous, two filaments hairy. . . . . 1. *P. Kingii,* Prain.

B. Calyx split in front; lower lip ciliate.

*Hood without beak, calyx with very short lobes.

+ Plant of large size; corolla rose; hood hairy on the back and on the edge; lower lip nearly as long as the hood; two filaments hairy. . 2. *P. Legendrei,* Bonati.

+ + Plant dwarf; corolla yellow; hood glabrous on the back and on margin, scarcely ciliate at the base; lower lip much shorter than the hood; filaments all glabrous. . . . . 3. *P. Wardii,* Bonati.

**Hood terminating in a beak short and truncated, calyx with lobes elongated; corolla green. 4. *P. fragilis,* Prain.

If we seek to determine what is the geographical distribution of the series of the *Fragiles* we find that :—*P. fragilis,* Prain and *P. Kingii,* Prain both inhabit the Eastern Himalaya, the first Assam, the second Sikkim and Chumbi; *P. Legendrei,* Bonati has been found up to the present only from Eastern Szechwan; finally *P. Wardii,* Bonati is known so far only from S.E. Tibet.

The centre of evolution, and until we get further information,

the centre of creation of the series should therefore be placed in the south-east of Tibet. It must be added that Dr Handel-Mazzetti of the Botanical Institute of the University of Vienna, who has recently spent five years in China and has reported some new species from West Yunnan (Plateau of Chungtien), has informed me of the presence of *P. Kingii,* Prain in the regions which he has explored. If this is correct it would serve as an argument in support of the supposition I have made above.

7440 **Pedicularis lutescens,** Franch., var. **brevifolia,** Bonati. Var. nov.

This variety has all the essential characters of *P. lutescens,* Franch. but is a dwarf plant of 9–15 cm., annual, very hairy; stem simple; leaves similar to those of *P. deltoidea,* Franch., very hairy, 5–7 mm. long, oval-oblong, subsessile; calyx relatively shorter, 7–8 mm.; tube of the corolla 2–3 times as long as the calyx; hood and lower lip as in the typical form.

"West China :—Northern Yunnan. On stony pasture and in open pine forests on the N.W. flank of the Lichiang Range. Lat. 24° 30′ N. Alt. 11,000 ft. Plant of 3–5 ins. Flowers pale yellow. Aug. 1914." G. Forrest. No. 13,028.

7442 **Pedicularis lutescens,** Franch., var. **ramosa,** Bonati. Var. nov.

Plant annual, much branched at the base, with branches divaricate, glabrescent at the base, very hairy at the top; leaves suborbicular, obtusely crenulate with somewhat long petioles; petioles about 5 mm. long, lamina 10 mm. long and as much broad; bracts with membranous broadly dilated base. Floral characters of type; tube of corolla not exceeding the calyx.

"West China :—Marshy, stony pasture on the mountains in the N.E. of the Yangtze bend, Yunnan. Lat. 24° 45′ N. Alt. 11,000–12,000 ft. Plant of 2–4 ins. Flowers yellow. August 1913." G. Forrest. No. 10,775.

7436 **Pedicularis lutescens,** Franch., var. **tongtchouanensis,** Bonati. Var. nov.

Plant robust, stems hairy, more or less flexuose, 20 cm. high or over, rarely branched; leaves hairy, subsessile, oval-oblong, 29–30 mm. long, deeply pinnatilobed with triangular obtuse lobes; petioles 2–3 mm. long, calyx membranous, deeply split in front into 5 lobes which are lanceolate, acute, much longer than broad, the top one entire, the lateral ones dentate; tube of the corolla 1½ times as long as the calyx, narrow; hood very long at the base and in a straight line with the tube, narrow (1.5 mm.), as

long as the tube; back strongly arched; margin with 8–10 teeth on each side.

E. Yunnan :—Tong-tchouan. E. E. Maire.

Pedicularis cymbalaria, Bonati. Sp. nov. (Lyratae).

Planta annua? Radix 5–6 cm. longa, radiculis multis divaricatis elongatis. Caules diffusi repentes vel ascendentes, cylindrici ac basi glabrescentes, summo plus minusve angulosi ac villosi, ramosi, ramis oppositis ac divaricatis, 10–15 cm. longi. Folia opposita longe petiolata glabrescentia suborbiculata, basi truncata vel cordata, circa 1 cm. longa ac lata, palmatilobata, lobis brevibus ac latis obscure lobulatis; petiolis 10–20 mm. longis margine membranaceis alatis, basi dilatatis. Bracteae foliiformes. Flores omnes axillares oppositi longe pedunculati, pedunculis 5–20 mm. longis glabris erectis. Calyx villosus campanulatus 10–12 mm. longus, usque ad medium fissus in lobos 5 inaequales; lobo summo lanceolato-lineato acuto integro; lobis posterioribus latissimis flabellatis profunde palmatilobulatis; anterioribus ovato-elongatis basi constrictis summo pinnatilobulatis, lobulis rotundis; nervis reticulatis paulo eminentibus. Corolla glabra, azurea vel rosea, 20–25 mm. grandis, tubo brevi 3–4 mm. cylindrico extus glabro, intus fauce et ad insertionem staminum villoso; galea falciformi elongata, circa 20 mm. longa, erostrata horizontaliter truncata, summo obtuso, margine inferiore quoque latere addito dente filiformi elongato a summo circa 4 mm. distante; labio inferiore galea breviore, 10–12 mm. longo, lobis 3 subaequalibus medio paulo eminente emarginato margine glabro, lateralibus margine denticulatis ac plus minusve ciliatis. Staminum filamenta omnia glabra, ad summum ovarii inserta; antheris summo truncatis, loculamentis breviter attenuatis acutis.

"West China :—Moist, stony pasture on the Mekong-Salween divide, Yunnan. Lat. 28° 10′ N. Alt. 13,000 ft. Plant of 2–3 ins. Flowers pale rose. August 1914." G. Forrest. No. 13,222.

"S.E. Tibet :—On moist, shady banks in pine forest on Kagwr-pw, Mekong-Salween divide, Tsarong. Lat. 28° 30′ N. Alt. 11,000 ft. Plant of 4–6 ins. Flowers light blue. August 1914." G. Forrest. No. 14,582.

This species is allied to *P. lutescens,* Franch. of which it has most of the floral characters. It differs by :— (1) its habit, its creeping stems, the form of its leaves, its longer petioles and peduncles, etc.; (2) the light blue or rose colour of its corolla; (3) the lower lip half the length of hood with lobes subequal, the median projecting only slightly, emarginate, non-denticulate and glabrous; (4) the hood having a single tooth on each of the lower margin.

It differs from *P. pseudostenocorys*, Bonati, which also has only one tooth on each side of the lower margin of the hood, by :—(1) its habit, the form of its leaves, the colour of its corolla; (2) the form of its calyx; (3) its staminal filaments all glabrous; (4) the lower lip with lateral lobes crenulate and slightly ciliate.

The series of the *Lyratae* to which I again attach the *Ternatae* separated in error in 1910, contains now 6 species which can be arranged as follows :—

Series Lyratae.

A. Radical leaves very large, 20–25 cm. with long petioles, bipinnatifid; teeth of calyx entire; only one tooth on each side of the margin of the hood. 1. *P. cernua*, Bonati.

B. Leaves all similar.

+ Hood having only one tooth on each side of the lower margin.

*Two staminal filaments hairy; lower lip with margin not crenulate; leaves pinnatipartite; corolla yellow. . . . . 2. *P. pseudostenocorys*, Bonati.

**All the filaments glabrous; lateral lobes of the lower lip crenulate and ciliate with scattered trichomes; corolla rose or blue; leaves palmatilobed; plant creeping. . . 3. *P. cymbalaria*, Bonati.

++ Lower margin of hood with several teeth on each side.

*Calyx with teeth entire; corolla yellow, with three to five teeth on each side of the margin of the hood. . . . . 4. *P. lyrata*, Prain.

**Calyx with teeth incised.

△ Hood with two teeth on each side of the lower margin; two filaments hairy; corolla small, red; tube of corolla twice as long as the calyx; leaves small, deltoid, shortly petiolate. . . .. 5. *P. deltoidea*, Franch.

△△ Lower margin of hood with four or six teeth; filaments glabrous; tube of the corolla of the same length as the calyx; corolla large, yellow; leaves large. 6. *P. lutescens*, Franch.

Pedicularis atra, Bonati. Sp. nov. (Bidentatae verticillatae e serie Melampyriflorarum).

Radix? Caulis glaber simplex erectus, 40–50 cm. altus, basi cylindricus, summo quadrangulosus. Folia glabra quaterne ver-

ticillata longe petiolata; petiolis plus minusve basi alatis, inferioribus 15–30 mm. longis, superioribus brevioribus (circa 10 mm.); limbo 5–6 cm. longo, 15–30 mm. lato, ovato-oblongo obtuso pinnatifido, 10–12 jugis loborum ovato-obtusorum et acutidentatorum. Bracteae inferiores foliiformes, subsessiles, basi in petiolos alatos attenuatae; superiores basi membranaceae, latae, perlucidae, limbo foliaceo ovato-obtuso superficialiter acutidentato; omnes floribus breviores, superiores fere calycem aequantes. Flores inferiores axillares oppositi et pedunculati, superiores sessiles in spicis 4–5 cm. longis paucifloris. Calyx glaber angulosus, nervis 8 non reticulatis, circa 1 cm. longus, superficialiter antice fissus, lobis 3 inaequalibus; lobo summo brevissimo (circa 1–2 mm.) lineato integro vel vix denticulato; lobis lateralibus majoribus inciso-crenatis summo fissis in lobulos 2 ovato-obtusos raro mucronatos acutidentatos 1.5–2 mm. longos, circa 1 mm. latos. Corolla purpurea circa 3 cm. longa; tubo cylindrico calycem paulo superante, circa 1 cm. longo, glabro basi rectangulatim curvato; galea obliqua falciformi glabra, circa 15 mm. longa, rotunda antice in sacco clausa; margine inferiore quoque latere dente parvo addito, distante 2–3 mm. a summo; labio inferiore circa 1 cm. longo, galea breviore, erecto margine glabro paulo profunde trilobato, lobis 2–3 mm. longis, circa 5 mm. latis, lateralibus majoribus ovato-rotundis, medio multo breviore ovato-obtuso vel superficialiter trilobulato, 2 mm. longo ac lato; galea paralleliter bicristata. Stamina ad trientem inferiorem tubi inserta; filamentis omnibus glabris; antherarum loculis breviter apiculatis. Capsula ac semina?

"Upper Burma:—By streams in marshy meadows, and steep banks; limestone; flowers crimson. Valley of Naw-chaung. Aug. 1914." F. Kingdon Ward. No. 1918.

A plant belonging to the series of the *Melampyriflorae*. Its habit is similar to that of *P. pseudo-atra*, Bonati and recalls that of *P. chamissonis*, Stev., of Japan. Its flowers much exceeding the bracts and decumbent are characteristic. Its calyx has a form recalling that of *P. Mairei*, Bonati.

Pedicularis pseudo-atra, Bonati. Sp. nov. (Melampyriflorae).

Planta *P. atrae*, Bonati valde affinis ac primo conspectu absolute similis. Rhizoma obliquum breve truncatum, radiculis filiformibus elongatissimis. Caulis simplex erectus glaber angulosus circa 40 cm. altus. Folia radicalia caduca; caulinaria 4-verticillata glabra erecta petiolata ovato-oblonga, basi truncata, summo acuta, profunde pinnatifida, 10–12 jugis segmentorum lineato-obtusorum basi decurrentium profunde acutidentatorum; petiolis 15–20 mm. longis compressis ac stricte alatis; limbo 45–60 mm. longo, 15–25 mm. lato. Bracteae inferiores flores

aequantes (10–12 mm.), lineares vel oblongae petiolulatae, petiolo 4–5 mm. longo; limbo pinnatilobato, 15–20 jugis loborum triangularium acutorum. Flores sessiles erecti, in spica terminali compacta ac pauciflora. Calyx membranaceus perlucidus, circa 10 mm. longus, glaber, costis vel nervis primariis 5 non reticulatis, lobis 5 triangularibus acutis, circa 1 mm. longis, plus minusve incisis. Corolla purpurea 20–25 mm. longa; tubo circa 10 mm. longo cylindrico glabro, 10 mm. longo erecto; galea glabra, 10 mm. longa, in parte inferiore obliqua 5 mm. longa, in parte verticali 5–6 mm. longa, crista summo profunde saccata, in parte inferiore finita in apicem brevissimum obtuse truncatum et dentibus duobus brevibus additum; labio inferiore galeam aequante glabro basi stipitato, lobis ovato-obtusis, medio lateralibus minore. Stamina prope basin tubi inserta; filamentis duobus villosis; antheris truncatis et summo obscure cordatis, loculamentis longe apiculatis. Capsula ac semina?

"Upper Burma:—Laktang. Alt. 9,000 ft. Flowers crimson, in meadows or under bamboos, not too heavily shaded. Aug. 1919." F. Kingdon Ward. No. 3581.

Plant allied to *P. atra*, Bonati, from which it differs by two of its staminal filaments hairy, and its calyx with teeth entire.

Pedicularis Reynieri, Bonati. Sp. nov. (Melampyriflorae).

Planta perennis villosa stolonifera. Radix ac stolones cum tuberculis villosis, 2–3 mm. diametro et parasito cryptogamo quod apparet ortis; radiculis filiformibus rectangulatim ramificatis. Caules graciles decumbentes flexuosi simplices vel paulo ramificati angulosi villosissimi, 30–40 cm. longi. Folia villosa 4-verticillata, inferiora multo mediis ac superioribus minora (5–10 mm.), caduca petiolata; petiolis 3–4 mm. longis; media ac superiora subsessilia, inde sessilia; limbo 20–25 mm. longo, 10–15 mm. lato, triangulari obtuso pinnatifido, segmentis ovato-obtusis acutidentatis, paucis (7–9), longis 5–7 mm. latis 3–4 mm. Bracteae foliiformes superiores flores aequantes profunde dentatae sessiles. Flores axillares 4-verticillati sessiles vel subsessiles. Calyx brevis (6–7 mm.) cylindricus membranaceus paulo villosus, nervis 5 eminentibus; nervis secundariis paulo apparentibus reticulatis; tubo circa 5 mm. longo; lobis 2 mm. longis aequalibus basi contractis ac subfiliformibus, summo lanceolatis et acutidentatis. Corolla alboflava; tubo 10 mm. longo extus villosissimo; galea recta (quod est tubum recte sequens), circa 5 mm. longa, dorso rotunda, finita in apicem circa 1 mm. longum oblique truncatum ac margine inferiore quoque latere dente brevi additum, trichomis ac pilis glandulosis dense tectum; labio inferiore galeam aequante (circa 5 mm.), margine dense ciliato, fauce cristis duabus eminentibus addito, lobo medio

truncato, lateralibus brevioribus triangulato-acutis. Stamina ad medium tubi corollae inserta, filamentis omnibus glabris. Capsula ac semina?

"Upper Burma. Laktang. Alt. 8,000 ft. In leaf mould in upper part of forest among thin undergrowth, also in heavily-shaded gully where the Primulas grow. Lips of the flowers pale lemon-yellow, fading to colourless in the tube. August 1919." F. Kingdon Ward. No. 3572.

A plant of peculiar appearance; in its stamens with filaments all glabrous and its calyx with five teeth it approaches *P. melampyriflora,* Franch.; it is easily distinguished from that species by its hood being very hairy and without crest, by its appearance, etc.

The discovery by Mr Kingdon Ward of *P. atra,* Bonati, *P. pseudo-atra,* Bonati and *P. Reynieri,* Bonati increases to 7 the number now known of the series of the *Melampyriflorae.* The whole of the series is reviewed in the following table.

Series Melampyriflorae.

A. Staminal filaments all glabrous.
  *Calyx with five teeth.
    + Hood with a crest. 1. *P. melampyriflora,* Franch.
    + + Hood without crest, very hairy. 2. *P. Reynieri,* Bonati.
  **Calyx with three teeth, the two lateral sometimes superficially bifid.
    + Hood with a crest and terminating in a short beak; leaves fleshy, pinnatisect with linear segments. . . . . 3. *P. Mairei,* Bonati.
    + + Hood without crest, no beak; leaves membranous, pinnatilobed, with segments broadly oval. . . . . 4. *P. atra,* Bonati.

B. At least two staminal filaments hairy.
  *Only two staminal filaments hairy.
    + Hood with crest, and very short beak. Plant of large size, shaggy, branched. . . . . 5. *P. pseudo-melampyriflora,* Franch.
    + + Hood without crest and without beak; teeth of calyx triangular, acute, entire, equal; plant glabrous, with stem simple. . . . 6. *P. pseudo-atra,* Bonati.
  **All the filaments hairy.
    Hood with a crest and a short beak; teeth of calyx unequal, more or less incised. 7. *P. floribunda,* Franch.

Pedicularis multicaulis, Bonati. Sp. nov. (Verticillatae).

Planta annua vel biennis? Radix fibrosa. Caules plurimi

(10–12), simplices erecti 10–25 mm. alti angulosi subalati glabri vel paulo villosi. Folia pinguia ovato-obtusa glabra, inferiora breviter petiolata, superiora subsessilia, limbo 5–10 mm. longo pinnatilobato; jugis 4–5 loborum triangularium vel ovatorum acutidentatorum. Bracteae foliiformes sessiles. Flores in verticillis plurimis et sparsissimis; inflorescentia ad 15 cm. longa et ultra. Calyx globosus membranaceus perlucidus glaber vel vix margine ciliatus, nervis non reticulatis, dentibus 5 aequalibus 1 mm. longis, medio subulato, lateralibus linearibus obtusis vix crenatis; tubo 3–4 mm. longo. Corolla purpurea patula, tubo ab ore calycis curvato, 6–10 mm. longo, summo latiore, extus glabro ac intus ad insertionem staminum; labio inferiore glabro profunde trilobato, lobis emarginatis; medio paulo proeminente, lateralibus divergentibus. Stamina medio tubi inserta; filamentis duobus villosis. Capsula patula glabra lucens, circa 10 mm. longa, mucronata. Semina ovata basi apiculata reticulata, magna, 2 mm. longa.

"Upper Burma :—Paijawng Bum. Lat. 26° 10′ N. Long. 98° 30′ E. Alt. 12–13,000 ft. Flowers pale purple or pinkish-purple, with darker reticulations on the lower spreading lip. On open grassy slopes and ledges facing N. at the summit. July 1919." **F. Kingdon Ward. No. 3440.**

"Chimili Valley. Alt. 11–12,000 ft. Open alpine fields and crags. July 1919." **R. Farrer. No. 1142.**

LIST OF DETERMINATIONS.

Forrest		
6015	*P. integrifolia*, Hook. f.	Eastern flank of the Lichiang Range. 27° 30′ N. 11,000 ft. July 1910.
7605	*P. Henryi*, Maxim.	Hills to the east of Tengyueh. 25° N. 6,000 ft. May 1912.
7849	*P. Henryi*, Maxim.	Ming-kwong Valley. 25° 15′ N. 7,000 ft. May 1912.
8050	*P. polyphylla*, Franch.	Hills east of Tengyueh. 25° N. 6–7,000 ft. June 1912.
8950	*P. taliensis*, Bonati	Western flank of the Shweli-Salween divide. 25° 20′ N. 9–10,000 ft. August 1912.
8955	*P. gracilis*, Wall.	Western flank of the Shweli-Salween divide. 25° 20′ N. 10–11,000 ft. August 1912.
9028	*P. Monbeigiana*, Bonati	Western flank of the Shweli-Salween divide. 25° 20′ N. 11,000 ft. Fls. rose. August 1912.
9146	*P. Monbeigiana*, Bonati *var. birmanica*, Bonati.	Upper Burma. Summit of the Sansi Gorge. 25° 25′ N. 9,500 ft. Fls. bright rose. Sept. 1912.
10111	*P. lachnoglossa*, Hook. f.	Lichiang Range. 27° 30′ N. 13–14,000 ft. Fls. crimson-rose. June 1913.
10129	*P. integrifolia*, Hook. f.	Lichiang Range. 27° 30′ N. 11,000 ft. July 1913.
10150	*P. integrifolia*, Hook. f.	Open chalky pasture on the Lichiang Range. 27° 30′ N. 10–11,000 ft. Fls. deep crimson. June 1913.
10201	*P. Elwesii*, Hook. f.	Lichiang Range. 27° 35′ N. 12–13,000 ft. June 1913.
10360	*P. Forrestiana*, Bonati	Mountains in the N.E. of the Yangtze bend. 27° 45′ N. 12–13,000 ft. July 1913.
10445	*P. polyphylla*, Franch.	Open, stony pasture in the mountains in the N.E. of the Yangtze bend. 27° 45′ N. 11,000 ft. July 1913.
10480	Indeterminable	No flowers.
10490	*P. integrifolia*, Hook. f.	Mountains in the N.E. of the Yangtze bend. 27° 45′ N. 12,000 ft. July 1913.
10550	*P. polyphylloides*, Bonati	Mountains in the N.E. of the Yangtze bend. 27° 45′ N. 10,000 ft. July 1913.
10553	*P. Smithiana*, Bonati	On the hills to the east of the Lichiang Valley. 27° 15′ N. 10,000 ft. July 1913.
10597	*P. Forrestiana*, Bonati	Chungtien Plateau. 27° 55′ N. 12,000 ft. Fls. deep rose. July 1913.
10604	*P. aequibarbis*, Hand.-Mzt.	Chungtien Plateau. 27° 55′ N. 11,000 ft. July 1913.
10775	*P. lutescens*, Franch. *var. ramosa*, Bonati.	In marshy, stony pasture on the mountains in the N.E. of the Yangtze bend. 27° 45′ N. 11–12,000 ft. Fls. yellow. August 1913.

10776	*P. Handel-Mazzettii*, Bonati	Chungtien Plateau. 27° 55′ N. 12,000 ft. Fl. rose. August 1913.
10789	*P. rhodotricha*, Maxim.	Chungtien Plateau. 27° 55′ N. 12,000 ft. Fl. soft rose. August 1913.
10792	*P. aequibarbis*, Hand.-Mzt.	Mountains in the N.E. of the Yangtze bend. 27° 45′ N. 10,000 ft. August 1913.
10801	*P. dolichocymba*, Hand.-Mzt. (= *tristiformis*, m.)	In the N.E. of the Yangtze bend. 27° 45′ N. 12,000 ft. August 1913.
10805	*P. Elwesii*, Hook. f.	Chungtien Plateau. 27° 55′ N. 12,000 ft. Fl. bright rose. August 1913.
10813	*P. salviaeflora*, Franch.	On the T'ong Shan in the Yangtze bend. 27° 20′ N. 8–9,000 ft. August 1913.
10836	*P. sigmoidea*, Franch.	On the T'ong Shan in the Yangtze bend. 27° 20′ N. 10–11,000 ft. Fls. rose. August 1913.
10838	*P. tsekouensis*, Bonati	On the T'ong Shan in the Yangtze bend. 27° 20′ N. 10,000 ft. Fls. pale yellow with just a touch of rose on helmet. Dry, open, stony pasture. August 1913.
10870	*P. Viali*, Franch.	On the T'ong Shan in the Yangtze bend. 27° 20′ N. 10,000 ft. August 1913.
10878	*P. gracilis*, Wall.	On the T'ong Shan in the Yangtze bend. 27° 20′ N. 10,000 ft. Fls. rose. August 1913.
10896	*P. trichoglossa*, Hook. f.	Chungtien Plateau. 27° 55′ N. 12,000 ft. August 1913.
10965	*P. pseudo-melampyriflora*, Bonati	T'ong Shan, in the Yangtze bend. 27° 20′ N. 10,000 ft. August 1913.
10990	*P. comptoniaefolia*, Franch.	On the margins of the thickets on the Yung-peh mountains. 26° 45′ N. 9–10,000 ft. Fls. magenta rose. Sept. 1913.
11040	*P. rigida*, Franch.	Dry, stony pasture on the Yung-peh mountains. 26° 45′ N. 9,000 ft. Fls. deep crimson. Sept. 1913.
11160	*P. yargongensis*, Bonati.	Chungtien Plateau. 27° 55′ N. 9,000 ft. Sept. 1913.
11194	*P. comptoniaefolia*, Franch.	T'ong Shan (Yunnan). 27° 20′ N. 10–11,000 ft. Sept. 1913.
11560	*P. deltoidea*, Franch.	Western flank of the Tali Range. 25° 40′ N. 10,000 ft. Fls. rose. August 1913.
11563	*P. yunnanensis*, Franch.	Western flank of the Tali Range. 25° 40′ N. 11–12,000 ft. Fls. magenta-rose. Sept. 1913.
11693	*P. polyphylla*, Franch.	Tali Range. 25° 40′ N. 10,000 ft. August 1913.
11769	*P. polyphylla*, Franch.	Shweli-Salween divide. Moist, stony pasture. 25° 30′ N. 9,000 ft. Fls. pale rose. Sept. 1913.
11917	*P. Henryi*, Maxim.	Shweli-Salween divide. 25° 20′ N. 9,000 ft. Fls. red. August 1913.
11969	*P. humilis*, Bonati	Stony pasture on the Shweli-Salween divide. 25° 30′ N. 10,000 ft. July 1913.
12469	*P. axillaris*, Franch.	On the Yangtze-Yungning divide. 27° 45′ N. 10–11,000 ft. June 1914.
12782	*P. trichoglossa*, Hook. f.	N.W. flank of the Lichiang Range. 27° 25′ N. 12,000 ft. Fls. deep crimson. July 1914.
12873	*Phtheirospermum auratum*, Bonati	In pine forests in the mountains of the Chungtien Plateau. 27° 30′ N. 12,000 ft. July 1914.

12974	*P. gyrorhyncha*, Franch.	Kari Pass, Mekong-Yangtze divide. 27° 40′ N. 10–11,000 ft. Fls. yellow, beak crimson. August 1914.
13026	*P. Viali*, Franch.	Shady situations on the mountains of the Chungtien Plateau. 27° 30′ N. 11,000 ft. Fls. pale rose. August 1914.
13028	*P. lutescens*, Franch. *var. brevifolia*, Bonati	On stony pasture and in open pine forests on the N.W. flank of the Lichiang Range. 27° 30′ N. 11,000 ft. 3–5 ins. Fls. pale yellow. August 1914.
13063	*P. rigida*, Franch.	Mekong Valley. 27° 40′ N. 9,000 ft. Fls. deep rose. August 1914.
13070	*P. kariensis*, Bonati	Open, moist, stony pasture on the Kari Pass, Mekong-Yangtze divide. 27° 40′ N. 13,000 ft. 2–3 ins. Fls. deep rose. August 1914.
13130	*P. Forrestiana*, Bonati	Kari Pass, Mekong-Yangtze divide. 27° 40′ N. 12,000 ft. August 1914.
13139	*P. dolichocymba*, Hand.-Mzt. *var.*	On the Mekong-Yangtze divide. 27° 40′ N. 12,000 ft. Fls. deep rose. August 1914.
13174	*P. dichotoma*, Bonati	On the Bei-ma Shan, Mekong-Yangtze divide. 28° 20′ N. 13,000 ft. 4–7 ins. Fls. light and dark rose. August 1914.
13187	*P. cranolopha*, Maxim. *var. Garnieri.*	Bei-ma Shan. Moist pasture. 28° 20′ N. 12,000 ft. August 1914.
13222	*P. cymbalaria*, Bonati	Moist, stony pasture on the Mekong-Salween divide. 28° 10′ N. 13,000 ft. August 1914.
13294	*P. tsekouensis*, Bonati	Moist, stony pasture on the Mekong-Salween divide. 28° 10′ N. 13,000 ft. Fls. pale rose. Sept. 1914.
13390	*P. hirtella*, Franch.	Open, stony pasture on the margins of pine forests, Mekong-Salween divide. 28° 10′ N. 12,000 ft. Fls. creamy-yellow, flushed and tipped rose. Sept. 1914.
13462	*P. gyrorhyncha*, Franch.	Amongst scrub on the Ghi Shan, east of Tali Lake. 25° 48′ N. 9,000 ft. Fls. dull orange, with beak rose. August 1914.
14023	*P. Oederi*, Vahl	Bei-ma Shan. 28° 12′ N. 14,000 ft. Fls. pale yellow. June 1917.
14165	*P. rhinanthoides*, Schrenk. *var. labellata*, Jacq. mixed with *P. verbenaefolia*, Franch.	Mekong-Salween divide. 28° 12′ N. 9–10,000 ft. July 1917.
14200	*P. lucifuga*, Bonati	On Ka-gwr-pw, Mekong-Salween divide. 28° 25′ N. 10,000 ft. Fl. rose, beak darkest. Shady pasture on the margins of pine forests. July 1917.
14248	*P. cernua*, Bonati	Mekong-Salween divide. 28° 12′ N. 13,000 ft. Fls. pale rose, beak darkest. Moist alpine pasture. July 1917.
14367	*P strobilacea*, Franch. *var. riparia*, Bonati.	Mekong-Salween divide. 28° 12′ N. 13,000 ft. Fls. white or pale rose. Alpine meadows. July 1917.
14369	*P. Viali*, Franch.	Ka-gwr-pw. 28° 25′ N. 13,000 ft. July 1917.
14389	*P. dichotoma*, Bonati *var.*	On the Bei-ma Shan. 28° 12′ N. 14,000 ft. Fls. pale rose, beak crimson. July 1917.

14395	*P. pseudo-ingens*, Bonati.	On the Bei-ma Shan. 28° 12′ N. 12–13,000 ft. Fls. rose, beak darkest. July 1917.
14405	*P. Elwesii*, Hook. f.	On the Bei-ma-shan. 28° 12′ N. 14–15,000 ft. Fls. rose. July 1917.
14411	*P. Bietii*, Franch.	On the Bei-ma Shan. 28° 12′ N. 14–15,000 ft. Plant of 1 in. Fls. bright rose. Boggy pasture. July 1917.
14431	*P. rupicola*, Franch.	Mekong-Salween divide. 28° 12′ N. 13,000 ft. Fls. rose. July 1917.
14439	*P. siphonantha*, D. Don	On Ka-gwr-pw, Mekong-Salween divide. 28° 25′ N. 14,000 ft. July 1917.
14468	*P. rhinanthoides*, Schrenk *var. labellata*, Jacq.	Mekong-Salween divide. 28° 12′ N. 13,000 ft. Fls. rose. July 1917.
14578	*P. plicata*, Maxim.	Mekong-Salween divide. 28° 12′ N. 12,000 ft. Fls. pale yellow. August 1917.
14579	*P. dolichocymba*, Hand.-Mzt.	Mekong-Salween divide. 28° 12′ N. 13,000 ft. Fls. deep magenta-rose. August 1917.
14581	*P. strobilacea*, Franch. *var. riparia*, Bonati.	Mekong-Salween divide. 28° 12′ N. 13,000 ft. Fls. creamy-white, beak deep rose. July 1917.
14582	*P. cymbalaria*, Bonati	On Ka-gwr-pw, Mekong-Salween divide. 28° 30′ N. 11,000 ft. August 1917.
14588	*P. rhodotricha*, Maxim.	Mekong-Salween divide. 28° 12′ N. 14,000 ft. Aug. 1917.
14648	*P. Monbeigiana*, Bonati	Mekong-Salween divide. 28° 12′ N. 12,000 ft. August 1917.
14664	*P. trichoglossa*, Hook. f.	Mekong-Salween divide. 28° 12′ N. 12,000 ft. Fls. deep, soft rose. August 1917.
14697	*P. galeata*, Bonati	Mekong-Salween divide. 28° 12′ N. 14,000 ft. Fls., base yellowish, apex and beak deep black-crimson. August 1917.
14710	*P. likiangensis*, Franch.	Mekong-Salween divide. 28° 12′ N. Aug. 1917.
16207	*P. tribuloides*, Bonati.	Salween Valley. 28° 10′ N. 10,000 ft. Margins of thickets by streams. 6–10 ins. Fls. rose. June 1917.
16802	*P. microchila*, Franch.	Mu-li mountains. 28° 12′ N. 12,000 ft. Fls. deep rose. August 1918.
Monbeig		
39	*P. tenuisecta*, Franch.	Tse-kou. 1912.
52	*P. verbenaefolia*, Franch.	Tse-kou. 1912.
65	*P. Lipskyana*, Bonati	Tse-kou. 1912.
72	*P. Monbeigiana*, Bonati	Tse-kou. 1912.
78	*P. likiangensis*, Franch.	Tse-kou. 1912.
Maire		
150	*P. Labordei*, Vant.	Tong-Tchouan. 2600 m. juillet 1914.
182	*P. tachanensis*, Bonati	Marécages du Plateau de Ta-chan. 2200 m. Fls. roses. août 1914.
191	*P salviaeflora*, Franch.	Pan-pien-kai. 2550 m. oct. 1914.
192	*P. gracilis*, Wall.	Pan-pien-kai. 2550 m. oct. 1914.
195	*P. alopecuros*, Franch.	Tong-Tchouan. 2700 m. oct. 1914.
216	*P. phaceliaefolia*, Franch.	Lieux humides à Long-ky. 700 m. Fls. roses. août 1913.
257	*P. oxycarpa*, Franch.	Pan-pien-kai. 2700 m. sept. 1914.
385	*P. Mairei*, Bonati	Collines de Pi-ka-tang. 2700 m. oct. 1914.
400	*P. veronicifolia*, Franch.	Tong-Tchouan. 2550 m. oct. 1914.

671	*P. salviaeflora*, Franch.	Ma-kong. 2800 m. août 1913.
672	*P. dolichantha*, Bonati	Haut plateau de Ié-ma-tchouan. 3200 m. Fl. rose sombre. août 1913.
673	*P. praealta*, Bonati	Ié-ma-tchouan. 3200 m. Fl. jaunes. août 1913.
674	*P. gracilis*, Wall.	Plateau de Ta-hai. 3200 m. août 1913.
677	*P. rex*, Clarke	Pou-long-tse. 2450 m. juillet, 1913.
678	*P. tahaiensis*, Bonati	Plateau de Ta-hai, 3200 m. Fl. rose. juillet 1913.
679	*P. oxycarpa*, Franch.	Tong-tchouan. 2700 m. juillet 1913.
680	*P. densispica*, Franch.	Tong-tchouan. juillet 1913.
681	*P. gracilis*, Wall.	Pan-pien-kai. sept. 1913.
682	*P. salviaeflora*, Franch.	Tong-tchouan. 2700 m. sept. 1913.
683	*P. Mairei*, Bonati	Pan-pien-kai. collines calcaires. 2500 m. juillet 1913.
684	*P. comptoniaefolia*, Franch.	Coll. de Tcheou-Kia-tse-tang. 2550 m. sept. 1913.
685	*P. Labordei*, Vant.	Tong-tchouan. sept. 1913.
686	*P. Labordei*, Vant.	Tong-tchouan. sept. 1913.
687	*P. densispica*, Franch.	Ié-ma-tchouan. 3200 m. juillet 1913.
688	*P dolichantha*, Bonati	Lagunes du Plateau de Ta-hai. 3200 m. Fl. roses. juillet 1913.
689	*P. veronicifolia*, Franch.	Tong-tchouan. 2550 m. sept. 1913.
722	*P. salviaeflora*, Franch.	La-kou. 2400 m. juillet 1913.
891	*P. densispica*, Franch.	Montagnes de Tong-tchouan. 2600 m. juin, 1914.
1034	*P. deltoidea*, Franch.	Pâturages du plateau de Ié-ma-tchouan. 3200 m. août 1913.
1061	*P. densispica*, Franch.	Tong-tchouan. 2700 m. juin, 1913.
——	*P. Labordei*, Vant.	Tong-tchouan. 2700 m. Oct.
——	*P. oxycarpa*, Franch.	Tong-tchouan. 2700 m. Oct.
——	*P. tongtchouanensis*, Bonati	Tong-tchouan. 2700 m. Sept.
Ridley		
86	*P. chinensis*, Maxim.	Kan-su. 1914.
Kingdon Ward		
415	*P. macrosiphon*, Franch.	A-tun-tsu. 1913.
554	*P. rex*, Clarke	A-tun-tsu. 13–14,000 ft. 1913.
566	*P. yunnanensis*, Franch.	A-tun-tsu. 7.6.1913.
663	*P. macrosiphon*, Franch.	Doker-la. 10–12,000 ft. 1913.
683	*P. strobilacea*, Franch. *var. riparia*, Bonati	11,000 ft. No locality. 4.7.1913.
761	*P. lachnoglossa*, Hook. f.	Doker-la. 13.7.1913.
812A	*P. quadrata*, Bonati	Ka-gwr-pw. 15,500 ft. 1913.
812B	*P. praeruptorum*, Bonati	Ka-gwr-pw. 15,500 ft. 1913.
812C	*P. Elwesii*, Hook. f.	Ka-gwr-pw. 15,500 ft. 1913.
818	*P. lineata*, Franch.	Ka-gwr-pw. 15,500 ft. Precipices, etc. 19.7.1913.
828	*P. Oederi*, Vahl *var. sinensis*, Maxim.	Ka-gwr-pw. 15,500 ft. 20.7.1913.
881	*P. Wardii*, Bonati	Ka-gwr-pw Temple. 15,000 ft. 27.7.1913.
935	*P. lacerata*, Bonati.	A-tun-tsu. 13,000 ft. 2.8.1913.
950	*P. dichotoma*, Bonati *var. Wardiana*, Bonati.	A-tun-tsu. 13,000 ft. 2.8.1913.
974	*P. dolichocymba*, Hand.-Mzt.	A-tun-tsu. 14,500 ft. 6.8.1913.
987	*P. superba*, Franch.	A-tun-tsu. 14,500 ft. 7.8.1913.
989	*P. trichoglossa*, Hook. f.	A-tun-tsu. 14,500 ft. 7.8.1913.
1007	*P. cymbalaria*, Bonati	A-tun-tsu. 15,000 ft. Aug. 1913.
1052	*P. Duclouxii*, Bonati	A-tun-tsu. 13–14,000 ft. 18.8.1913.
1053	*P. Viali*, Franch.	A-tun-tsu. 18.8.1913.

1070	*P. dichotoma*, Bonati *var. Wardiana*, Bonati	A-tun-tsu. 11,000 ft. 20.8.1913.
1105	*P. insignis*, Bonati	Doker-la. 14,000 ft. 1913.
1692	*P. taliensis*, Bonati	Hpimaw. 9–10,000 ft. 20.6.14.
1744	*P. taliensis*, Bonati	On granite in the forests. Hpimaw, Upper Burma. Fl. pink. 8–10,000 ft. 6.7.1914.
1802	*P. multicaulis*, Bonati	Open screes, etc., Naung Chaung, Nwai divide. Upper Burma. 12–13,000 ft. 16.7.14.
1881	*P. gracilis*, Wall.	Hpimaw Pass. Open S.-facing hillsides. 10,000 ft. 12.8.1914.
1918	*P. atra*, Bonati	Valley of the Naw-chaung. Upper Burma. By streams in marshy meadows. Fl. crimson. 28.8.1914.
1919	*P. Pantlingii*, Prain	Valley of the Naw-chaung. Upper Burma. 28.8.1914.
3253	*P. siphonantha*, D. Don *var. Hookeriana*	Laktang. Upper Burma. 26° 10′ N. 8–9,000 ft. Colours the hills. 26.6.1919.
3290	*P. taliensis*, Bonati	Laktang. 26° 10′ N. 8–11,000 ft. Two vars. Fl. white and stems pale, the other has crimson flowers and dark stems. 29.6.1919.
3293	*P. laktangensis*, Bonati	With No. 3253. On granite. 26° 10′ N. 9–10,000 ft. 30.6.1919.
3380	*P. siphonantha*, D. Don *var. birmanica*	Imaw Bum. 12,000 ft. Fls. purple. 25.7.1919.
3398	*P. lineata*, Franch.	Imaw Bum. 13,000 ft. Fls. bright crimson. 27.7.1919.
3399	*P. nobilis*, Bonati	Imaw Bum. 13,000 ft. Fls. bright crimson, sometimes white. 27.7.1919
3400	*P. cernua*, Bonati	Boulders on the giant's stairway. N. face of Imaw. 13,000 ft. Fl. pinkish-crimson. 27.7.1919.
3440	*P. multicaulis*, Bonati	Paijawng Bum. Upper Burma. Facing N. at the summit. 12–13,000 ft. 31.7.1919.
3441	*P. birmanica*, Bonati	Paijawng Bum. Upper Burma. 26° 10′ N. 12–13,000 ft. Fl. bright crimson. 31.7.1919.
3457	*P. gracilis*, Wall.	Laktang. Open meadows. S.-facing slopes. 26° 10′ N. 8–9,000 ft. Fl. crimson. 3.8.1919.
3572	*P. Reynieri*, Bonati	Laktang. Upper Burma. 8,000 ft. Fl. pale lemon-yellow, fading to colourless in the tube. 25.8.1919.
3581	*P. pseudo-atra*, Bonati	Laktang. 9,000 ft. 27.8.1919.
3605	*P. Viali*, Franch.	Imaw Bum. Upper Burma. 11,000 ft. 2.9.1919.
R. Farrer		
1120	*P. taliensis*, Bonati	Hpimaw. Upper Burma. 9–10,000 ft. Fl. pinkish. July 1919.
1140	*P. siphonantha*, D. Dou *var. birmanica*, Bonati.	Chimili Valley. 10,000 ft. July 1919.
1141	*P. taliensis*, Bonati	Chimili Woods. 10,000 ft. Fls. pale pink. July 1919.
1142	*P. multicaulis*, Bonati	Chimili Valley. 11–12,000 ft. July 1919.
1143	*P. Pantlingii*, Prain *var. chimiliensis*, Bonati.	Chimili Woods. 10,000 ft. July 1919.
1200	*P. nobilis*, Bonati	Chimili Alps. 12,500 ft. August 1919.
1204	*P. Monbeigiana*, Bonati	Chimili Valley. 10,900 ft. August 1919.
1216	*P. Viali*, Franch.	Chimili Valley. 11,000 ft. Fl. pale pink to whitish. August 1919.

Schneider		
1516	*P. cephalantha*, Franch. *var. szetchuanica*, **Bonati**	In pratis inter Hunka et Woloho. 3200 m. Szetchuan austral. Jun. 1913.
1524	*P. densispica*, Franch.	Szetchuan. Inter Hunka et Woloho. 2900–3200 m. Jun. 1913.
1587	*P. macrosiphon*, Franch.	Szetchuan austral. Inter Woloho et Choso, in sylvis. 2900 m. Jun. 1913.
1710	*P. densispica*, Franch. *var. Schneideri*, **Bonati.**	In pratis humidis, inter Yung-peh-ting et Taowang. 2400 m. Jul. 1914.
3763	*P. cephalantha*, Franch. *var. szetchuanica*, **Bonati**	In pratis inter Woloho et Humati. 2800 m. Jun. 1915.
Clemens		
9080	? ?	Shansi. Sept. 1913.
9082	*P. Tatarinowii*, Maxim.	Tsu Yangh et Wutaishan (Shan-si) Sept. 1913.

DIAGNOSES

Specierum novarum

in herbario Horti Regii Botanici Edinburgensis cognitarum.

DI-DL.

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Scrophularia chasmophila, W. W. Sm., p. 181.
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ACERACEAE : Acer salweenense, W. W. Sm., p. 151.
ALANGIACEAE : Alangium shweliense, W. W. Sm., p. 152.
BETULACEAE : Betula riparia, W. W. Sm., p. 155.
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ROSACEAE : Potentilla eriocarpa, Wall., var. tsarongensis, W. E. Evans, p. 178.
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SYMPLOCACEAE : Symplocos Forrestii, W. W. Sm., p. 185.
TILIACEAE : Sloanea Forrestii, W. W. Sm., p. 182.

Acer salweenense, W. W. Sm. Sp. nov.

Species affinis *A. laevigato,* Wall. a quo petiolis axibusque inflorescentiae sub anthesin dense et longe villosis praeter alia signa facile distinguitur.

Arbor vel frutex 9–12 m. altus. Ramuli juniores gracillimi, annotini pallido-virides vel cinerascentes glabri lenticellis paucis inconspicuis notati, hornotini longe et densiuscule incano- vel fulvido-villosi. Folia in juventute tenuiter membranacea petiolo circ. 1 cm. longo dense fulvido-villoso praedita; lamina vulgo 6–9 cm. longa, 2–2.5 cm. lata, lanceolata, apice longe acuminata atque apiculata, basi rotundata, margine integra vel paulo undulata, primum utrinque araneoso-fulvido-villosa, cito glabrescens nisi ad costam ubi indumentum est magis persistens. Corymbus vulgo 10–16-florus, pedunculo 1–2 cm. longo dense villoso suffultus, circ. 1 cm. longus et latus, pedicellis 4–12 mm. longis villosis. Flores ex collectore purpureo-virides. Sepala 3.5–4 mm. longa, oblonga vel ovato-oblonga, obtusa vel subacuta, extra sparsim et longiuscule villosa. Petala sepalis longiora vel sub-aequantia, late obovata vel fere subquadrata, saepe latiora quam longiora, margine irregulariter dentata vel erosa. Stamina circ. 8 bene exserta. Ovarium dense hirsutulum. Fructus immaturus alis angulo recto divergentibus.

"West China :—Shweli-Salween divide, Yunnan, in open mixed forests. Lat. 25° N. Alt. 7,000 ft. Shrub of 30–40 ft.

Flowers purplish-green. April 1919." G. Forrest. No 17797.

"Eastern flank of the N'Maikha-Salween divide, Yunnan, in thickets. Lat. 26° 12′ N. Alt. 8,000 ft. Shrub of 20–30 ft. May 1919." G. Forrest. No. 17839.

The following is closely akin in the slender branchlets and in the lanceolate long-acuminate leaves. It differs in the finely serrulate leaf-margins and glabrous petioles. It is probably a distinct species but the specimens show foliage only.

"Shweli-Salween divide, at Ta-hoh-ping, Yunnan, in mixed forests. Lat. 25° 4′ N. Alt. 7–8,000 ft. Tree of 40–60 ft. Young foliage only. April 1919." G. Forrest. No. 17792.

Alangium shweliense, W. W. Sm. Sp. nov.

Species affinis *A. Faberi,* Oliver a quo foliis ovato-lanceolatis longe petiolatis inter alia differt.

Arbor 6–15 m. alta, ramulis ultimis sat crassis fulvido-tomentellis annotinis tarde glabrescentibus. Folia petiolo 2.5–4 cm. longo dense fulvido-tomentello suffulta; lamina plerumque 9–14 cm. longa, 5.5 8 cm. lata, ovata vel ovato-lanceolata, apice longe et tenuissime acuminata, basi plus minusve late rotundata, saepe asymmetrica, integra, in sicco tenuiter papyracea, supra sparsim adpresse setulosa, subtus subglabra nisi ad costam venasque dense fulvido-tomentellas, nervis 7 9 paribus. Cymae circ. 4–5-florae, pedunculo petiolum paulo superante plerumque circ. 5 cm. longo tomentello suffultae; pedicelli 5-6 mm. longi. Flores non visi. Fructus ovoideus 13 mm. longus, 6–7 mm. latus, sepalis et disco coronatus, exocarpio crasso carnoso, endocarpio lignoso, semine unico.

"West China :—Shweli-Salween divide, Yunnan, in mixed thickets and forests. Lat. 25° 40′ N. Alt. 8–9,000 ft. Tree of 40 ft. In fruit, fruits dull red. August 1919. G. Forrest. No. 18309.

"Shweli-Salween divide in mixed thickets in side valleys. Lat. 25° 20′ N. Alt. 8–9,000 ft. Shrub or tree of 20–40 ft. In fruit, fruits dull red. August 1919." G. Forrest. No. 18372.

"Shweli Valley, in open situations. Lat. 25° 20′ N. Alt. 7,000 ft. Tree of 30–50 ft. In fruit. September 1917." G. Forrest. No. 15835.

Alseodaphne dumicola, W. W. Sm. Sp. nov.

Species ramis dense fulvo-tomentosis, foliis infra et perianthio circ. 8 mm. longo tomento fulvido persistente bene indutis notata; *A. crassipes,* Hook. f. ex descriptione fortasse est affinis.

Frutex 6–7.5 m. altus ramis brevibus crassis angulatis fulvo-tomentosis, senioribus foliorum dilapsorum cicatricibus nodosis

atque lenticellis magnis notatis. Folia persistentia tenuiter coriacea ad apicem ramorum subapproximata petiolo ad 3.5 cm. longo robusto persistenter fulvo-tomentoso suffulta; lamina vulgo 12–20 cm. longa, 6–10 cm. lata, obovata vel subelliptica, apice rotundata vel obtusa saepe breviter acutata, basi cuneata vel subrotundata, supra nitens glabra, sulco impresso ad basin tomento impleto excepto, nervis circ. 10 paribus distinctis paulo impressis, infra tomento fulvido ubique densiuscule induta, costa media nervisque valde prominentibus cum nervulis prominulis conspicuo reticulatis. Paniculae breviramosae circ. 8 cm. longae, pedunculo robusto rigido dense fulvo-tomentoso, pedicellis brevissimis. Perianthii segmenta 6 inaequalia, exteriora circ. 5 mm. longa ovata, interiora 8 mm. longa, oblongo-lanceolata, utrinque fulvo-tomentella. Stamina perfecta 9, circ. 5 mm. longa, filamentis fulvido-villosulis, ea ordinis tertii glandulis binis fere sessilibus praedita; antherae dorso villosulae; staminodia ordinis quarti villosula. Ovarium depresso-globosum fere 2 mm. diametro villosulum stylo circ. 3 mm. villosulo praeditum. Fructus deest.

"West China :—Shweli-Salween divide, Yunnan, in dense thickets in side valleys. Lat. 25° 40′ N. Alt. 8,000 ft. Shrub of 20–25 ft. Flowers, exterior light brown, interior ruddy brown. June 1919." G. Forrest. No. 18071.

Alseodaphne mollis, W. W. Sm. Sp. nov.

Species inter congeneres indicas atque chinenses foliis infra cinereo-villosis, paniculis gracilibus sericeis lactifloris, floribus parvis, inter alia notata.

Frutex vel arbor 6–12 m. alta, ramis gracilibus dense cinereo-tomentosis, annotinis tarde glabrescentibus. Folia persistentia ad apicem ramorum subapproximata papyracea petiolo ad 1.5 cm. longo dense cinereo-tomentoso munita; lamina vulgo 12–16 cm. longa, 6–10 cm. lata, obovata vel subelliptica, apice rotundata vel obtusa vel breviter acuminata, basi late cuneata vel subrotundata, primum ad superficiem superiorem sparsim villosula, ad costam nervosque 6–7 paria dense tomentosa, tandem glaberrima, infra initio ubique dense ac molliter tomentosa, tandem sparsius, costa nervisque supra impressis infra eminentibus. Paniculae paucae graciles ad 12 cm. longae 12–20-florae, ramulis brevibus ubique dense sericeis, pedicellis 3–5 mm. longis. Perianthii segmenta 6, circ. 2.5 mm. longa, ovata vel oblonga, subaequalia, nunc interiora paulo latiora, utrinque minute sericea lactea. Stamina perfecta 9, ea ordinis primi et secundi eglandulosa filamentis paulo villosulis, ea ordinis tertii biglandulosa glandulis breviter stipitatis filamentis villosis antheris extrorsum dehiscentibus; staminodia longiuscula apice lanceolata fila-

mentis longis dense villosis. Ovarium globosum circ. 1 mm. diametro stylum aequans. Fructus subglobosus circ. 1.5 cm. diametro perianthii tubo valde incrassato ac elongato insidens, perianthii segmentis delapsis.

"West China :—Salween Valley, Yunnan, in open thickets. Lat. 25° 6′ N. Alt. 4,000 ft. Shrub or tree of 20–40 ft. Flowers creamy-white. April 1917." G. Forrest. No. 13667.

"Shweli-Salween divide, Yunnan, in thickets. Lat. 25° 30′ N. Alt. 9,000 ft. Shrub of 20–30 ft. In fruit. October 1917." G. Forrest. No. 16021.

Anemone polycarpa, W. E. Evans. Sp. nov.

Species ex affinitate *A. obtusilobae*, D. Don a qua foliis in lobos 5–7 profunde multifidos pinnatisectis, sepalis distincte concavis vix translucentibus supra opaco-albidis infra saturate purpureo-coeruleis, toro globulari papillis globosis achaeniferis numerosissimis (circ. 80) ultra antheras pertinentibus, stigmatibus valde circinatis discrepat.

Planta glabrescens vel parce longi-pilosa 20–30 cm. alta. Rhizoma breve crassum saepe adscendens, supra foliorum delapsorum vaginis fibrosis onustum, infra radices sat numerosas fibrosas ad insertionem breviter tuberoso-incrassatas emittens. Folia radicalia circ. 8–10; lamina circ. 4 cm. longa, 3.5 cm. lata, ambitu subtriangularis pinnatisecta in lobos 5–7 profunde multifidos partita, petiolo ad 15 cm. longo basi membranaceo-expanso suffulta. Scapi vulgo uniflori ad 30 cm. alti flexuoso-adscendentes; involucri phylla tria libera sessilia profunde multifida a flore plerumque 4–8 cm. remota. Flores mediocres 1.5–2 cm. diametro. Sepala vulgo 6, usque ad 1 cm. longa, 6 mm. lata, obovata supra valde concava apice paulo cucullata opaco-griseo-alba, infra saturate purpureo-coerulea parce longi-pilosa margine integra haud ciliata. Stamina numerosa carpellis paulo longiora plus minusve atro-purpurea, filamentis planis late linearibus ad apicem sed vix ad basim attenuatis, antheris ellipticis lateraliter dehiscentibus. Achaenia circ. 80 ab initio dense pilosa in papillas tori globosi valde distinctas inserta, stylo distincto, stigmate valde circinato-incurvato.

"China :—Yunnan, Mekong-Salween divide. Lat. 28° 10′ N. Alt. 12,000 ft. Plant of 10–12 inches. Flowers deep purple. Open, stony pasture." G. Forrest. No. 13320. Fl. September 1914. Type!

"S.E. Tibet :—Tsarong, on Doker-la, Mekong-Salween divide. Lat. 28° 25′ N. Alt. 11,000 ft. Plant of 12–18 inches. Flowers interior bluey-grey, exterior deep blue. Moist, shady situations on boulders and cliffs by streams." Fl. July 1918. G. Forrest. No. 16671.

This may be the plant referred to by Franchet in Plant. Delav. Livr. 1, p. 10, as ? *Anemone demissa*, Hook f. et Thoms. var. *yunnanensis*.

Betula riparia, W. W. Sm. Sp. nov.

Species ex affinitate *B. luminiferae*, Winkl. et *B. Baeumkeri*, Winkl. a quibus bracteis magnis in fructu maturo samaras longe superantibus inter alia signa distinguitur; a *B. alnoides*, Buch.-Ham. amentis solitariis nec non foliorum nervatione facile recognoscitur; samarae eis *B. luminiferae* subsimiles.

Frutex 6–9 m. altus. Ramuli primo pilosuli, annotini glabri atrobrunnei nitentes. Folia petiolo 1–1.5 cm. longo primum longiuscule albido- vel fulvido-piloso suffulta; lamina majorum 8–10 cm. longa, 4–6 cm. lata, ovato-oblonga vel ovato-lanceolata, longe et argute acuminata et glanduloso-apiculata, basi rotundata, margine ad acumen ipsum argute serrata, supra atroviridis glabra, infra pallidior ad costam nervosque adpresse albido-pilosa, saepe sparsim; nervi utrinque 12–16. Inflorescentiae fructiferae solitariae (pendulae?) ad 9 cm. longae, 6–7 mm. latae, cylindricae; bracteae conspicuae samaras superantes circ. 6 mm. longae margine ciliolatae lobo intermedio spathulato lateralibus 2–3-plo longiore. Nuculae obovatae pubescentes alis membranaceis paulo tantum latioribus cinctae eis *B. luminiferae* minores.

"West China :—Li-ti-ping, Yangtze-Mekong divide, Yunnan, forming thickets by streams. Lat. 27° 12′ N. Alt. 10,000 ft. Shrub of 20–30 ft. June 1918." G. Forrest. No. 16334.

A member of the *Acuminatae*, Regel, this species is distinguished by the multicostate leaves and the conspicuous bracts.

Catalpa tibetica, G. Forrest. Sp. nov.

Species valde affinis *C. ovatae*, G. Don a qua floribus majoribus, fructibus brevioribus atque latioribus, seminibus duplo majoribus recedit.

Frutex altitudinis ignotae. Folia quoad formam atque magnitudinem eis *C. ovatae* similia supra glabrescentia infra molliter pubescentia. Inflorescentiae forma cum ea *C. ovatae* quadrat. Calyx 8–9 mm. longus lobis rotundatis. Corolla 2.5 cm. longa vel paulo ultro lobis rotundatis erosulis. Fructus 13–18 cm. longus, 1.2–1.3 cm. latus, cylindricus, paululo curvatus.

"S.E. Tibet :—Salween-Kiu-chiang divide, Tsarong, in mixed forests. Lat. 28° 40′ N. Long. 98° 15′ E. Alt. ? Flowers creamy-yellow, flushed and marked pale purple and yellow. June 1919." G. Forrest. No. 18950.

"August 1919. In fruit." G. Forrest. No. 18926.

The above does not agree in size of flower, in size and shape of fruit, nor in the seeds with numerous specimens of the well-known *C. ovata,* G. Don.

Chlorophytum flaccidum, W. W. Sm. Sp. nov.

Species affinis *C. undulato,* Wall. a quo foliis latioribus, scapo in ramos elongatos flaccidos basi diviso inter alia recedit.

Planta 30–40 cm. alta. Folia ad 40 cm. longa, ad 3.3 cm. lata, anguste lanceolata, acuminata, in sicco tenuiter membranacea atque flaccida. Scapus prope basim in ramulos ad 30 cm. longos debiles divisus; bracteae 1–2.5 cm. longae lineari-lanceolatae, longe acuminatae, pedicellis nunc breviores, nunc fere aequantes. Flores 1–4-nati internodiis 2–3 cm. inter se distantibus. Perianthii albi segmenta circ. 1.3 cm. longa, anguste lanceolata, subacuta, margine late scariosa. Antherae 6 mm. longae filamenta duplo superantes. Stylus perianthio vix brevior gracilis. Capsula circ. 7 mm. diametro seminibus cuique loculo 4–6 nigris.

"West China :—Mekong Valley, Yunnan, on open rocks and ledges of cliffs. Lat. 27° 40′ N. Alt. 9,000 ft. Plant of 12–16 inches. Flowers watery-white, lined brownish on exterior. August 1914." G. Forrest. No. 13122.

"Mekong-Salween divide, Yunnan, on stony pasture and on ledges of cliffs. Lat. 28° 10′ N. Alt. 10,000 ft. Plant of 9–12 inches. Flowers white, anthers yellow. September 1914." G. Forrest. No. 13393.

The above and the following two species are akin to *C. undulatum,* Wall. showing branched racemes with scattered flowers or groups of flowers. In *C. oreogenes* the inflorescences are erect and somewhat rigid; in the other two species they are weak and flaccid. *C. mekongense* is distinguished by the very large bracts; *C. flaccidum* by the scape much divided from near the base into branches which are almost decumbent and bear the flowers at remote nodes.

Chlorophytum mekongense, W. W. Sm. Sp. nov.

Species ex affinitate *C. undulati,* Wall. a quo foliis perlatis, bracteis praelongis saepe 5–6 cm. superantibus, inter alia recognoscitur.

Planta robusta. Folia plerumque 8–10, 30–60 cm. longa, ad 5 cm. lata, anguste oblanceolata, longe acuminata, in partem petiolarem longe attenuata, in sicco tenuiter membranacea. Scapus foliis multo brevior ad 15 cm. longus sed vix bene evolutus, crassiusculus, flexilis haud rigidus, mediocriter florosus. Bracteae permagnae saepe 5–6 cm. longae, nunc ad 8 cm., lanceolatae vel lineari-lanceolatae, acuminatae, tenuiter membranaceae,

subvirides. Pedicelli ad 1.5 cm. longi glabri. Perianthii pallide flavi segmenta circ. 1 cm. longa lanceolata acuta vel subacuta 5-nervia margine late albido-scariosa. Antherae 5 mm. longae filamentis circ. duplo longiores. Ovarium trigonum 1.5 mm. altum stylo gracili circ. 1 cm. longo. Fructus maturus deest.

"West China :—Mekong-Salween divide, Yunnan, in shady situations by streams. Lat. 28° N. Alt. 9,000 ft. Plant of 1½–2 ft. Flowers pale yellow. August 1918." G. Forrest. No. 16925.

Chlorophytum oreogenes, W. W. Sm. Sp. nov.

Species affinis *C. undulato,* Wall. a quo foliis latioribus flaccidis, floribus majoribus erectis, filamentis antheras aequantibus praeter alia signa divergit.

Planta ad 60 cm. alta. Folia ad 36 cm. longa, ad 2.5 cm. lata, loriformia, acuminata, in sicco tenuiter membranacea atque flaccida. Scapus elatus multiflorus ramosus ramis gracilibus sed rigidiusculis. Bracteae lineari-lanceolatae, acuminatae, rigidae, ad 1.5 cm. longae. Pedicelli bracteas suas plerumque paulo superantes. Perianthii albi segmenta circ. 1 cm. longa, ovata-lanceolata, subacuta. Filamenta 4 5 mm. longa antheras aequantia. Stylus 7 mm. longus. Capsula triquetra circ. 7 mm. diametro loculis 4 6-seminiferis, seminibus compressis 2 mm. diametro nigris.

"West China :—On the Yung-peh Mountains, Yunnan, on rocks and ledges of cliffs. Lat. 27° 45′ N. Alt. 10,000 ft. Plant of 1½–2 feet. Flowers white; anthers pale yellow. August 1913." G. Forrest. No. 11183.

Codonopsis rosulata, W. W. Sm. Sp. nov.

Species affinis *Codonopsidi meleagri,* Diels a qua foliis late ovatis irregulariter serratis infra glabris, floribus minoribus pallido-coeruleis praeter alia signa differt.

Planta 60–90 cm. alta inter gramina subscandens. Caulis flexuosus e radice tuberosa ortus basi rosulatim foliatus, supra fere nudus foliis multo reductis 1–2 munitus stramineus glaber. Folia radicalia circ. 8 petiolo 1 2 cm. longo latiusculo praedita; lamina vulgo 6–7 cm. longa, 5–6 cm. lata, late ovata, apice bene rotundata, basi breviter cordata, margine lacerato-serrata, in sicco tenuiter membranacea, supra glabra vel tantum ad basim pubescens, infra glabra paulo pallidior, costa media latiuscula; folia caulina fere sessilia vulgo 1 cm. longa, raro ad 3.5 cm. Flores terminales solitarii vel nunc bini fortasse cernui. Calycis lobi circ. 1 cm. longi lanceolati acuti virides glabri. Corolla pallido-coerulea immaculata circ. 1.6 cm. longa fere ad basim in lobos obovatos divisa. Staminum filamenta brevissima. Ovar-

ium inferum turbinatum circ. 8 mm. longum. Fructus deest.

"West China :—Muli Mountains, S.W. Szechwan, amongst heavy grass. Lat. 28° 12′ N. Alt. 11,000 ft. Plant of 2–3 feet. Weakly scandent. Flowers pale blue. August 1918." G. Forrest. No. 16856.

The floral details are incomplete as there is only one good flower which I have not dissected. Akin to *C. meleagris*, Diels and *C. subscaposa*, Kom. the species is easily distinguished by its leaf characters.

I append a note on four species of *Codonopsis* described from Yunnan and Kweichow by M. Léveillé.

C. accrescenticalyx, Lévl. in Cat. Pl. Yunnan, p. 24=*C. tubulosa*, Kom.

C. Bodinieri, Lévl. in Flore du Kouy Tchéou, p. 58=*C. lanceolata*, Benth. et Hook. f.

C. graminifolia, Lévl. in Cat. Pl. Yunnan, p. 24=*C. convolvulacea*, Kurz.

C. Maireï, Lévl. in Cat. Pl. Yunnan, p. 24=*C. Forrestii*, Diels.

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Cotylanthera yunnanensis, W. W. Sm. Sp. nov.

Species affinis *C. paucisquamae*, King a qua floribus majoribus albis nec coeruleis inter alia divergit.

Planta 5–10 cm. alta glaberrima albida carnosula. Folia squamiformia 2–4-paria lanceolata acuminata membranacea albida circ. 5 mm. longa. Flores solitarii. Calyx circ. 6 mm. longus fere ad imum in lobos quatuor ovatos acuminatos fissus tenuiter membranaceus costa conspicua pererratus albidus. Corolla pro planta magna alba extra purpureo-suffusa ; tubus fere sphaericus circ. 2.5 mm. diametro ; lobi 4 anguste oblanceolati, apice rotundati, 12–13 mm. longi. Stamina 4 ad apicem tubi inserta filamentis 4 mm. longis antheris 5 mm. longis paulo curvatis aurantiacis apice poro unico dehiscentibus. Ovarium subglobosum circ. 4 mm. diametro, stylo fere 8 mm. longo, stigmate capitato, seminibus numerosis. Fructus deest.

"West China :—Shweli-Salween divide, Yunnan, in very shady situations in forests. Lat. 25° N. Alt. 8,000 ft. Plant of 2–3 inches. Flowers white, flushed purple exterior; anthers orange. September 1919." G. Forrest. No. 18534.

"Tengyueh, Yunnan, in boggy pasture, at base of hills to west. Lat. 25° N. Alt. 6,000 ft. Plant of 2½–4 inches. Stems white, perianth pale purplish-blue; anthers golden yellow. July 1912." G. Forrest. No. 8496.

An interesting addition to the genus which contained previously only three species, one from Java, one from the Pacific Islands, and one from the East Himalaya.

Croton euryphyllus, W. W. Sm. Sp. nov.

Species affinis *C. Tiglio,* Linn. a quo foliis latissimis nunc maximis apice rotundatis vel obtuse acutatis basi cordatis atque 7-plinerviis, inflorescentiis elongatis, petalis in flore ♀ subulatis, ovario magis globoso, fructu minore muris crassis, seminibus circ. 9 mm. longis brunneo-marmoratis recedit.

Frutex 3–4 m. altus ramis glabris pallido-cinereis. Folia petiolo 3–9.5 cm. longo primum stellato-piloso mox glaberrimo suffulta; lamina nunc 7.5 cm. longa, 6.5 cm. lata, nunc ad 18 cm. longa et lata, late ovato-cordata, apice rotundata vel breviter obtuseque acutata, basi plerumque cordata atque glandulis binis magnis peziziformibus munita, margine serrata serraturis nunc grossis, in sicco membranacea, laete viridis, primum pilis stellatis raris conspersa, mox utrinque glabra vel fere glabra, nervis basalibus 7, ad medium laminae vel ultro attingentibus, nervis lateralibus 4–6 paribus, omnibus subtus eminentibus. Racemi terminales flexuosi ad 20 cm. longi glabri vel fere glabri, pedicellis circ. 4 mm. longis glabris vel pilis albis stellatis conspersis, bracteis subulatis. Sepala in flore ♂ 5, circ. 3 mm. longa, oblonga obtusa glabra apice villosulo excepto; petala sepalis aequilonga angustiora oblanceolata obtusa albo-villosula; glandulae disci conspicuae quadratae; stamina circ. 15 filamentis glabris, receptaculo villoso. Sepala in flore ♀ circ. 3.5 mm. longa erecta subglabra apice villosula intra glabra; petala parva subulata; glandulae subquadratae; ovarium subglobosum circ. 3 mm. diametro pilis flavidis stellato-tomentosum stylis gracilibus bipartitis. Fructus circ. 12 mm. longus, 11 mm. latus, stellato-tomentosus, muris sat crassis, seminibus in loculis solitariis 9 mm. longis 6 mm. latis trigonis brunneo-marmoratis.

"West China :—Mountains in the N.E. of the Yangtze bend, Yunnan, in open situations by streams. Lat. 27° 45′ N. Alt. 8–9,000 ft. Shrub of 10–12 ft. Flowers greenish-yellow. August 1913." G. Forrest. No. 10737.

"Yung-peh Mountains, Yunnan. Lat. 26° 45′ N. Alt. 9,000 ft. Shrub of 10 ft. Duplicate of No. 10737 in fruit. September 1913" G. Forrest. No. 11026.

Croton yunnanensis, W. W. Sm. Sp. nov.

Species affinis *C. caudato,* Geis. a quo habitu erecto, foliis utrinque molliter albido-tomentosis, stipulis simplicibus, staminibus paucioribus, disco in flore ♀ glabro inter alia divergit.

Frutex erectus 1–2 m. altus, ramulis teretibus dense albido-stellato-tomentosis tandem glabrescentibus pallido-cinereis. Folia petiolo 1–4 cm. longo albo-tomentoso praedita; lamina plerumque 5–8 cm. longa, 4–6 cm. lata, late ovata, apice acutata vix acuminata, basi breviter cordata vel nunc rotundata, margine

irregulariter dentata, in sicco papyracea, utrinque molliter tomentosa, indumento supra detersili infra denso persistente cinereo-albido, basi quintuplinervia, nervis ad mediam laminam attingentibus, nervis suprabasalibus 4–5 paribus; stipulae subulatae simplices tomentellae. Inflorescentiae solitariae terminales eis *C. caudati* subsimiles albido-tomentosae, basi femininae; pedicelli 1–2 mm. longi. Flos ♂ :—sepala 5, elliptica, obtusa, extra tomentosa; petala oblonga vel oblanceolata sepalis aequilonga apice albo-villosula; stamina circ. 12 perianthium superantia filamentis basi ima tantum villosulis ceterum glabris, receptaculo longiuscule albo-villoso. Flos ♀ :—sepala 3 mm. longa; petala fere obsoleta; ovarium subglobosum tomentellum, stylis ad medium bifidis infra minutissime villosulis. Fructus subglobosus stellato-tomentosus ad 7 mm. diametro seminibus trigono-ovoideis circ. 6 mm. longis pallido-olivaceis.

"West China :—Chungtien plateau, Yunnan, in dry, open situations amongst scrub. Lat. 27° 30′ N. Alt. 9,000 ft. Shrub of 4–6 ft. Flowers yellowish-green. July 1914." G. Forrest. No. 12612.

"Mountains on the N.E. of the Yangtze bend, Yunnan, in open scrub. Lat. 27° 45′ N. Alt. 10,000 ft. Shrub of 5–7 ft. Flowers immature. July 1913." G. Forrest. No. 10352.

Duplicate of No. 10352 in fruit. G. Forrest. No. 10522.

An ally from high elevation of *C. caudatus*, Gris. and *C. aromaticus*, Linn. It differs from *C. caudatus* more widely than *C. aromaticus* does from that species.

It may be noted here that *C. oblongifolius*, Roxb. extends into Western China :—

"Lava bed west of Tengyueh, Yunnan, in open scrub. Lat. 25° N. Alt. 5,000 ft. Shrub of 10–20 ft. Flowers green. April 1913." G. Forrest. No. 9839.

1837

Euonymus hystrix, W. W. Sm. Sp. nov.

Species affinis *E. aculeato*, Hemsl. a quo petiolis pedunculisque brevioribus, foliorum forma et serratura differt.

Frutex erectus 1.8–2.7 m. altus, ramulis junioribus subquadrangularibus viridibus. Folia persistentia petiolo 5–8 mm. longo suffulta; lamina 8–14 cm. longa, 2.5–5.5 cm. lata, plus minusve elliptica, apice breviter acuminata, margine serraturis parvis crebris regulariter notata, in sicco firme papyracea, utrinque glaberrima, supra opaco-viridis costa nervisque 6–9-paribus paulo eminentibus, reticulo nervulorum in sicco conspicuo, subtus pallidissima sed vix albescens, costa nervisque complanatis fere immersis, reticulo nervulorum valde indistincto. Pedunculi alati ad 2.5 cm. longi, cymis vulgo ter furcatis, pedunculis secundariis circ. 1 cm. longis, bracteis circ. 2

mm. longis subulatis. Flores 10-11 mm. diametro tetrameri flavi pedicellis 5 mm. longis. Discus quadratus cum sepalis anguste crescenti-lunatis glabris 4 mm. diametro aequans. Petala 4 mm. diametro orbicularia margine paulo erosula. Filamenta subulata vix 1 mm. aequantia. Capsula aculeis inclusis 1.4 1.8 cm. longa; aculei basi complanati 4–5 mm. longi; semina 6–7 mm. longa in arillo aurantiaco inclusa.

"West China :—Western flank of the Shweli-Salween divide, Yunnan, in mixed thickets and forests in ravines. Lat. 25° 40′ N. Alt.9-10,000 ft. Shrub of 6-9 ft. Flowers yellow. May 1919." G. Forrest. No. 17907.

The same in fruit. September 1919. G. Forrest. No. 18499.

Euonymus orgyalis, W. W. Sm. Sp. nov.

Species ex affinitate *E. Bockii,* Loes. a qua petiolis brevioribus, foliis tenuioribus basi rotundatis latioribus inter alia recedit.

Frutex 2–3 m. altus; ramuli hornotini angulati glabri virides, annotini cinerascentes. Folia opposita petiolo 2-3 mm. longo glabro praedita persistentia; lamina plerumque circ. 9 cm. longa, circ. 4.5 cm. lata, ambitu plus minusve elliptica, apice breviter obtuseque acutata, basi rotundata, margine subobscure denticulata, membranacea vel papyracea, supra atroviridis nitens glabra, infra olivacea glabra, nervis 6–8 paribus in sicco utrinque subconspicuis. Inflorescentiae axillares solitariae circ. 4 cm. longae bis terve dichotome divisae glabrae; pedunculus circ. 3 cm. longus gracilis; pedicelli ultimi circ. 3 mm. longi; bracteae subulatae. Flores tetrameri; sepala orbicularia 1 mm. diametro; petala suborbicularia circ. 2 mm. diametro; discus 2 mm. latus. Fructus deest nisi *Henry* 11403 huc recte allocari potest.

"West China :—Yunnan, at Feng Chen Len in mountain forests, south of Red River. 7,000 ft. elevation. Shrub 6 ft. high." A. Henry. No. 10661 in Herb. Edin. et Herb. Kew.

I believe the following in fruit to be the same species. The leaves are more acuminate than in the type.

"Yunnan, at Mengtsz, S.E. forests; 5,000 ft.; shrub of 10 ft." A. Henry. No. 11403 in Herb. Kew.

Galium aberrans, W. W. Sm. Sp. nov.

Species affinis *G. paradoxo,* Maxim. a quo foliis lanceolatis breviter petiolatis, floribus infundibuliformibus pentameris praeter alia signa differt; nec cum genere *Galio* nec *Rubia* nec *Spermacoce* nec *Borreria* quadrat et fortasse in genus novum ponenda.

Planta ad 7.5 cm. alta rhizomate gracili perennans. Caules annui numerosi e caudice orientes graciles basi bene foliati, medio subnudi, cymis paucifloris terminati, plus minusve pilosuli. Folia opposita ad 1.5 cm. longa, medio ad 3 mm. lata, petiolo vix 1 mm. longo pilosulo praedita, anguste lanceolata, apice subacuta, basi cuneata, tenuiter papyracea, atroviridia, supra sparsim pilosula, infra ad costam pilis albidis lineata, margine parce ciliolata; stipulae latae ad 4 mm. longae fere ad medium in dentes subsetaceos 3 7 incisae membranaceae brunneae sparsim pilosulae. Cymae paucifloraе plerumque 3-florae terminales floribus duobus ex axillis superioribus orientibus saepe additis; pedunculi breves vix 5 mm. superantes pilosuli; pedicelli 2–3 mm. longi terni bracteis stipuliformibus incisis basi muniti. Calycis lobi 5 oblongi obtusiusculi circ. 0.5 mm. longi; tubus cum ovario circ. 1 mm. diametro pilis glochidiatis albidis dense indutus. Corolla rosea circ. 5 mm. longa breviter infundibuliformis ad medium in lobos 5 lanceolatos fissa extra minute puberula. Stamina paulo infra sinus corollinos inserta, ad mediam corollam attingentia. Ovarium biloculare; ovula in loculis solitaria; stylus 4 mm. longus gracilis ramis brevibus. Fructus maturus deest.

"West China :—Chungtien Plateau, Yunnan, in stony, moist pasture. Lat. 27° 30′ N. Alt. 11,000 ft. Plant of 2–3 inches. Flowers rose. July 1914." G. Forrest. No. 12622.

"Mountains east of Chungtien, in open alpine pasture. Lat. 27° 50′ N. Alt. 14,000 ft. Plant of 1–3 inches. Flowers rose. June 1917." G. Forrest. No. 15084.

The above species is referred to *Galium* with some doubt. It has evident affinity with the peculiar *G. paradoxum*, Maxim. from S.E. Manchuria. Forrest collected under No. 10126 on the descent to the Yangtze from the eastern boundary of the Lichiang valley a plant which I cannot separate by the description from *G. paradoxum*. In the stipules and glochidiate hairs this plant suggests affinity with *G. aberrans*. The latter however has pentamerous flowers and a corolla more infundibular than rotate.

Garuga Forrestii, W. W. Sm. Sp. nov.

Species affinis *G. pinnatae*, Roxb. a qua foliolis stipellatis, floribus fructibusque multo minoribus inter alia longe recedit.

Arbor ad 15 m. alta. Rami crassi tomento denso fulvido patente diu persistente induti. Folia imparipinnata petiolo ad 8 cm. longo dense fulvido-tomentoso suffulta; rhachis ad 24 cm. longa dense tomentosa; foliola plerumque 5–7-juga sessilia plerumque 7–10 cm. longa, 2.5–3.5 cm. lata, oblique lanceolata, basi subrotundata, apice longe acuminata, margine serrato-crenata,

in sicco papyracea, supra densiuscule pilosa, infra molliter tomentosa, nervis vulgo 11–14 paribus; stipellae ovatae ad 5 mm. longae. Paniculae amplae foliis fere dimidio breviores multiramosae pilis patentibus fulvidis densissime indutae. Flores eis *G. pinnatae* multo minores. Calyx campanulatus circ. 3 mm. longus, fulvido-pilosus, 10-costatus, in lobos anguste triangulares acutos ad medium fissus. Petala 5 circ. 2.5 mm. longa oblonga ut videtur albida. Stamina 10 filamentis basi pilosulis. Ovarium pilosum. Stigma capitatum 5-lobatum. Fructus 8–9 mm. longus asymmetricus subpyriformis eo *G. pinnatae* multo minor in spec. nostris plerumque semine unico munitus.

"West China :—Descent to the Yangtze from the eastern boundary of the Lichiang valley, Yunnan, in open situations. Lat. 27° 15′ N. Alt. 7–8,000 feet. Tree of 40–50 feet. In fruit. Aug. 1913." G. Forrest, Nos. 10745, 11410. Also No. 16629 (July 1918); No. 16913 (September 1918).

The above species is an interesting addition to the Flora of China where the genus *Garuga* has not apparently been found previously. The specimens are in fruit. The description of the flowers is taken from one or two flowers still persistent on the fruiting branches.

475 **Ilex intricata**, Hook. f., var. **oblata**, W. E. Evans. Var. nov.

A typo habitu ex collectore multo elatiore, foliis multo latioribus in petiolum abruptius angustatis, fructibus 2–3-seminiferis differt.

A small, glabrous, evergreen tree, 6–9 metres high, with spreading branches; the secondary branches many, spreading horizontally, densely leafy, the younger closely covered with about 8 longitudinal rows of elongated warty excrescences 0.5 mm. or more in length. Leaves about 1–2 cm. long, leathery, rather dull on both surfaces, dark green above with impressed veins, paler beneath; the lamina broadly elliptic, suborbicular or even oblate, 5–15 mm. in length, the apex abruptly rounded or retuse, apiculate, the base almost truncate or at least rapidly narrowed, the margin obscurely serrate, the serrations with rounded outer margin and forward-directed apiculus; the petiole 3–6 mm. long, slender, markedly channelled above. Flower unknown. Fruit small, spherical, 4–5 mm. in diameter, smooth, dark brownish-black when dry, borne on a peduncle 2–4 mm. long and surmounted by the short broad style; loculi 2–3 (by abortion ?) each containing a pale stone.

"Upper Burma :—Lai Kam Valley-head. Alt. 8,500 ft. Small tree of 20–30 ft. with branches in flat moss-hung tiers, from a distance suggesting a Cedrus. Flower unknown. An uncommon occurrence in the upper rain-forest, in its opener

reaches, below the divide, at the top of the Lai Kam Valley. 19.9.19." R. Farrer. No. 1299.

Incarvillea altissima, G. Forrest. Sp. nov.

Species ex affinitate *I. Beresowskii*, Batalin a qua habitu elato, inflorescentia elongata, floribus majoribus, calyce ovarioque haud glanduliferis inter alia ex descriptione differt.

Planta glaberrima ad 2 m. alta. Caulis crassus bene foliatus; ramuli in axillis foliorum superiorum elongati multiflori. Folia alterna chartacea petiolo 7–9 cm. longo praedita pinnatipartita, segmentis radicalium non visis, eis caulinorum in speciminibus nostris 5 subaequalibus, terminali paulo majore, late ovatis, vulgo 8–12 cm. longis, 5–10 cm. latis, apice basique plus minusve rotundatis, crenaturis magnis regulariter notatis. Inflorescentiae praelongae in fructu ad 65 cm. longae ad 30-florae, floribus in racemo laxo dispositis, pedicellis 5–10 mm. longis. Calyx 15–17 mm. longus campanulatus 5-angulatus glaber ore subtruncatus, dentibus vix 2 mm. longis sed perlatis atque brevissime apiculatis. Corolla in sicco ad 7 cm. longa, pallido-rosea; tubus basi constrictus supra sensim ampliatus limbo subduplo longior. Ovarium glabrum, in fructu vix maturo ultra 6 cm. elongatum.

"West China :—On the Tong-Shan, Yunnan, in open situations amongst rocks and scrub. Lat. 27° 20′ N. Alt. 9,000 ft. Plant of 4–6 ft. Flowers pale rose. August 1914." G. Forrest. No. 13135.

"Yung-peh mountains, Yunnan. Lat. 26° 42′ N. Plant of 5 ft. Flowers rose. July 1918." G. Forrest. No. 16651. Also September 1918. No. 17062.

Leucothoe Griffithiana, Clarke. Descrip. amplif. W. W. Sm.

This species was described in the Flora of British India, iii (1882) 460, from fruiting material collected by Griffith in Bhutan. The flowers have remained unknown until Forrest collected in Yunnan under No. 15944 a plant which I am unable to separate from the Bhutan species. Old capsules with the seed shed are included in this collection; they agree with Griffith's plant. I add a description of the flower :—

Bractea circ. 3 mm. longa ovata subacuta textura carnosula multo involuta atque pedicellum amplectans eumque fere aequans, bracteolas celans. Bracteolae duae sub medio pedicello positae oppositae circ. 1 mm. longae acutiusculae subcucullatae. Calycis lobi circ. 2 mm. longi carnosuli subacuti ad quartam partem basi coaliti. Corolla suburceolata 5–6 mm. longa, 4 mm. lata, ad quadrantem in lobos ovatos fissa glabra. Stamina 10 filamentis 2 mm. longis complanatis glabris, antheris 1 mm. paulo superan-

tibus apice biaristatis. Ovarium depresso-globosum stylo 3 mm. longo simplici. Semina matura non visa.

"West China :—Yunnan. August 1917." G. Forrest. No. 15944. New to the flora of China.

Ligustrum Coryanum, W. W. Sm. Sp. nov.

Species affinis *L. rugosulo*, W. W. Sm. a quo foliis haud rugosis utrinque bene pilosis, pedicellis calycibusque pilis patentibus longiusculis fulvidis dense indutis inter alia recognoscitur.

Frutex erectus; ramuli juniores densissime et longiuscule fulvido-hirsuti, vetustiores cinerascentes sed (annotini saltem) indumento diu persistente muniti. Folia petiolo 3–5 mm. longo pilis fulvidis dense obsito praedita; lamina majorum ad 7 cm. longa, 2.5 cm. lata, nunc minorum circ. 1.5 cm. longa, 1 cm. lata, ovata vel elliptica vel elliptico-lanceolata, apice obtuse angustata, vel nunc bene rotundata, brevissime mucronulata, basi rotundata vel subrotundata vel nunc late cuneata, in sicco papyracea, supra opaco-viridis, pilis fulvidis subappressis bene conspersa, ad costam densius, infra dense atque molliter pilosa, nervis 4–6 paribus haud eminentibus subobscuris. Paniculae terminales ad 6 cm. longae, ad 4 cm. latae densiflorae; axes omnes densissime fulvo-pilosi; pedicelli ad 2 mm. longi dense pilosi. Calyx circ. 1.5 mm. longus cupularis extra undique dense pilosus dentibus 4 parvulis. Corolla alba 4–4.5 mm. longa glabra; tubus circ. 1.5 mm. longus; lobi oblongi obtusi tubo circ. duplo longiores. Filamenta glabra lobis corollinis longiora, antheris bene exsertis. Fructus deest.

West China :— Province of Yunnan. Collected in 1921. Details of the exact locality are not yet available. G. Forrest. No. 19358.

The specific name is in honour of Reginald Cory, Esq., of Duffryn, Cardiff, who is a keen supporter of botanical exploration in Western China.

Lindera kariensis, W. W. Sm. Sp. nov.

Species affinis *L. glaucae*, Bl. et *L. membranaceae*, Maxim.; foliis apice bene rotundatis, filamentis glabris inter alia notata.

Frutex 2–6 m. altus. Ramuli primum sparsim puberuli cito glabrescentes cinerascentes. Folia decidua ad anthesin evoluta, tunc tenuiter membranacea, maturitate papyracea, petiolo ad 1 cm. longo primum minute puberulo vel nunc fulvo-sericeo mox glabrescente suffulta; lamina vulgo 5.5–6.5 cm. longa, 3–3.5 cm. lata, plus minusve elliptica vel obovata, apice rotundata, basi late cuneata vel subrotundata, supra primum praesertim ad costam nervosque fulvo-pilosula tandem glabra vel fere glabra, infra pallido-viridis ad costam dense fulvo-sericea (ceteroquin sparsis-

sime) saepe tandem glabrescens; nervi 4–5 paria cum costa infra paulo eminentes. Inflorescentiae masculinae paucae ad apicem ramuli annotini orientes, ex axillis foliorum delapsorum enatae, quasi ad basim foliorum novorum positae, vulgo 3–6-florae, pedunculo nullo, pedicellis 5–7 mm. longis gracilibus dense fulvido-pilosis. Perianthii segmenta 6, circ. 3 mm. longa, ovata, apice rotundata, glabra, linea costali extra saepe sericea excepta. Stamina 9 circ. 2 mm. longa, filamentis glabris eis seriei tertiae biglandulosis, antheris bilocellatis. Flores feminini desunt. Fructus (si num. 13464 huc recte allocatus) fere globosus breviter apiculatus circ. 5 mm. diametro pedicello circ. 1 cm. longo suffultus, perianthii tubo vix incrassato.

"West China :—Ascent of the Kari pass east of Yeh-chih, Yunnan, in open thickets. Lat. 27° 40′ N. Alt. 9-10,000 ft. Shrub of 20 ft. Flowers olive-yellow. June 1917." G. Forrest. No. 13877.

"On the Li-ti-ping, Yunnan, amongst scrub. Lat. 27° 12′ N. Alt. 10,000 ft. Shrub of 6–9 ft. Flowers dull orange. June 1917." G. Forrest. No. 13950.

"Li-ti-ping, Yangtze-Mekong divide, in thickets on the margins of pine forests. Lat. 27° 12′ N. Alt. 11,000 ft. Shrub of 6–9 ft. Flowers olive-brown. June 1918." G. Forrest. No. 16331.

"S.E. Tibet :—On the Ka-gwr-pw, Mekong-Salween divide, Tsarong, in open thickets. Lat. 28° 35′ N. Alt. 9–10,000 ft. Shrub of 8–16 ft. Flowers olive-yellow. June 1918." G. Forrest. No.16563.

The following in fruit agrees well in twig, leaf, and indumentum :—

"Ghi Shan, east of Tali Lake, Yunnan, in open thickets. Lat. 25° 48′ N. Alt. 8,000 ft. Shrub of 20 ft. In fruit. August 1914." G. Forrest. No. 13464.

Lindera strychnifolia, Villar, var. **velutina**, G. Forrest. Var. nov.

Foliis primum subtus dense sericeis tarde glabrescentibus bene notata.

"West China :—Shweli-Salween divide, Yunnan, in thickets. Lat. 25° 20′ N. Alt. 7,000 ft. Shrub of 20 ft. Foliage only. September 1917." G. Forrest. No. 15928. Also July 1918. No. 17658.

Litsea euosma, W. W. Sm. Sp. nov.

Species aspectu *L. citratae*, Bl. a qua inter alia foliis subtus molliter villosis differt; etiam affinis *L. molli*, Hemsl. a qua foliorum forma removitur; a *L. salicifolia*, Roxb. ejusque varietatibus fructibus globosis distinguitur.

Frutex vel arbor 3–12 m. alta valde aromatica. Rami graciles primum cinereo-pubescentes mox glabrescentes nigricantes. Folia sub anthesi persistentia, sub fructu delapsa (sed eo tempore novella bene evoluta), alterna, tenuiter papyracea, petiolo 1–1.5 cm. longo cinereo-pubescente praedita; lamina vulgo 8–12 cm. longa, 3–4 cm. lata, lanceolata, longe acuminata, basi cuneata, supra laete viridis glabra, subtus subcinerea ubique subsparsim molliter villosa, costa media infra eminente densiuscule albido-villosa, nervis 9–12-paribus cum nervulis infra conspicuo reticulatis. Inflorescentiae masculinae numerosae e ramulo brevi pubescente orientes vulgo 3–6-natae, pedunculis gracilibus sparsim pubescentibus 1–1.5 cm. longis, umbellulis nutantibus, bracteis 4 subrotundatis circ. 5 mm. longis extra glabris vel subglabris intus sericeis, pedicellis 3 mm. longis sericeis. Perianthii segmenta 6 tenuiter membranacea subglabra circ. 3 mm. longa, oblonga vel subelliptica. Stamina 9 filamentis 3 mm. longis villosis eis seriei tertiae biglandulosis, antheris 1.5 mm. longis quadrilocellatis. Ovarii rudimentum conspicuum. Inflorescentiae femininae minus numerosae staminodiis biglandulosis conspicuis. Fructus maturus globosus circ. 5 mm. diametro apice apiculatus pedicello ad 5 mm. aucto suffultus, perianthii tubo vix incrassato.

"West China :—Hills to the North-West of Tengyueh, Yunnan, in open situations amongst scrub and in thickets. Lat. 25° 10′ N. Alt. 8,000 ft. Shrub or tree of 10–40 ft. Flowers golden yellow, fragrant. Bark and foliage aromatic. November 1912." G. Forrest. No. 9333.

"Divide between the Shweli and Tengyueh Valleys, in thickets and forests. Lat. 25° N. Alt. 6–7,000 ft. Shrub or tree of 20–40 ft. In seed. Foliage, bark and especially seeds and seed covers strongly fragrant of oil of lemons; seed covers full of an essential oil resembling same. Worthy of cultivation from an economic standpoint. May 1912." G. Forrest. No. 7858.

"Hills south of Tengyueh, in open thickets. Lat. 25° N. Alt. 8,000 ft. Shrub of 10–15 ft. Flowers yellow. December 1913." G. Forrest. Nos. 12101, 15951.

"N'Maikha-Salween divide, Yunnan, in thickets. Lat. 26° 10′ N. Alt. 8,000 ft. Fruits black. June 1919." G. Forrest. No. 17947.

The following fruiting specimen is probably conspecific :—

"South of Red River from Maumli, Yunnan. Alt. 6,000 ft. Tree of 20 ft." A. Henry. No. 9185.

2154 **Litsea shweliensis**, W. W. Sm. Sp. nov.

Species affinis *L. Wallichii*, Hook. f. a qua inter alia foliis obovatis longiuscule petiolatis facile distinguitur; *L. mishmien-*

sis, Hook. f. etiam affinis foliis 12–16-nerviis gaudet; *L. assamica*, Hook. f. staminibus villosis praeter alia signa recognoscitur.

Frutex vel arbor 3–12 m. alta. Ramuli mediocriter crassi glabri nigrescentes; alabastra foliaria anguste ovoidea circ. 1.5 cm. longa perulis fulvo-sericeis induta. Folia alterna diu persistentia sed sub anthesi plus minusve caduca textura firme papyracea, petiolo 3–4.5 cm. longo glabro suffulta, lamina plerumque 10–18 cm. longa, 6–10 cm. lata, obovata vel nunc subelliptica, apice subrotundata vel obtusa vel nunc acutiuscula, basi late cuneata, maturitate glaberrima, supra nitens pulchre reticulata, infra pallido-viridis, costa media prominula, nervis lateralibus inter se longe distantibus tantum 5–6-paribus utrinque paulo eminentibus. Umbellulae florum masculinorum solitariae vel 2–5-natae in axillis foliorum delapsorum vel caducorum orientes, vulgo 4-florae, saepe glomerulos circ. 20-floros efficientes, pedunculo brevissimo, pedicellis ad 1 cm. longis minute pubescentibus, bracteis sericeis cito deciduis; umbellulae florum feminorum non visae sed ex speciminibus fructiferis solitariae esse videntur. Perianthii segmenta 6 late ovata apice rotundata circ. 4 mm. longa glabra vel fere glabra. Stamina 9, filamentis brevibus glabris, ea seriei tertiae glandulis magnis carnosis praedita; antherae 4-locellatae omnes introrsum dehiscentes. Ovarii rudimentum subconspicuum. Fructus haud maturus ovoideus circ. 6 mm. longus tubo perianthii paululo aucto suffultus.

"West China :—Shweli-Salween divide, Yunnan, in open thickets. Lat. 25° 20′ N. Alt. 10,000 ft. Shrub of 10–20 ft. Flowers green. July 1917." G. Forrest. No. 15705.

"Shweli-Salween divide, in open forests. Lat. 25° 20′ N. Alt. 7–8,000 ft. Tree or shrub of 30–40 ft. Flowers deep green-yellow. August 1918." G. Forrest. No. 17531.

Also August 1912. G. Forrest. No. 9022. August 1917. G. Forrest. No. 15876. July 1918. G. Forrest. No. 17648. September 1918. G. Forrest. No. 17697.

All from the Shweli-Salween divide.

1040 **Lonicera tomentella**, Hook. f. et Thoms., var. **tsarongensis**, W. W. Sm. Var. nov.

A typo foliis magis ovatis subtus minus pilosis glaucescentibus, nervis conspicuis, corollae tubo graciliore extra glabro, **ovariis haud connatis divergit.**

"S.E. Tibet :—Salween-Kiu-chang divide, province of Tsarong, in open thickets. Lat. 28° 40′ N. Alt. ? Much-branched erect shrub of 3–5 ft. Flowers creamy-yellow, flushed pink. July 1919." G. Forrest. No. 18864.

This plant is so closely allied to *L. tomentella*, Hook. f. et Thoms. from the East Himalaya that I hesitate to make it more

than a variety of that species. In the small group of *Isoxylosteum*, Rehder the species and its variety are distinguished by the style equalling the tube of the corolla.

5677 **Machilus robusta,** W. W. Sm. Sp. nov.

Species ex affinitate *M. Kingii*, Hook. f.; foliis magnis paucinerviis, paniculis robustis numerosis, perianthiis minute sericeis, staminibus omnibus biglandulosis, filamentis glabris bene notata.

Arbor 9–15 m. alta, ramulis crassis cito glabrescentibus. Folia coriacea persistentia petiolo 2.5–5 cm. longo glabro praedita; lamina vulgo 12–26 cm. longa, 5–8 cm. lata, anguste elliptica vel suboblonga, apice subacuta nunc breviter acuminata, basi subrotundata vel late cuneata, utrinque glaberrima, infra pallida glaucescens, costa media supra impressa subtus valde eminente rubida, nervis plerumque 5–6 paribus inter se saepe 2.5 cm. distantibus prominulis. Paniculae ad apicem ramorum numerosae circ. 12 cm. longae multiflorae, pedunculis validis minute araneoso-puberulis, pedicellis circ. 5 mm. longis puberulis. Perianthii segmenta 6, ovata vel lanceolata, 5–8 mm. longa, utrinque sericeo-puberula. Stamina 9 circ. 5 mm. longa, plerumque omnia glandulis binis breviter stipitatis munita, nunc 1–2 eglandulosa, ea ordinis tertii extrorsum dehiscentia, filamentis glabris; staminodia ordinis quarti magna. Pistillum circ. 5 mm. stylo ovarium excedente. Fructus (si planta sub num. 10809 Henry huc recte allocatus) globosus 2.5 cm. diametro paulo superans.

"West China :—Hills to the north-east of Tengyueh, Yunnan, in thickets. Lat. 25° 10′ N. Alt. 6–7,000 ft. Tree of 30–40 ft. Flowers dull olive-yellow. March 1913." G. Forrest, No. 9716.

"Shweli Valley, Yunnan, in forests. Lat. 25° N. Alt. 6,000 ft. Tree of 40–50 ft. Flowers greenish-yellow. February 1913." G. Forrest. No. 9594.

"Shweli-Salween divide, Yunnan, in open thickets. Lat. 25° 20′ N. Alt. 7,000 ft. Shrub of 15–20 ft. Flowers dull olive-orange. February 1914." G. Forrest. No. 12216.

"Shweli-Salween divide, in thickets. Lat. 25° 30′ N. Alt. 8–9,000 ft. Shrub of 10–15 ft. In fruit. (Immature.) August 1917." G. Forrest. No. 15753.

Probably conspecific :—

"Mengtze Woods, Yunnan; 5,500 ft.; tree 20 ft.; fruit plum-black." A, Henry 10809 in Herb. Edin.

"Upper Burma :—Bhamo; alt. 5,500 ft. March 1909." G. E. S. Cubitt. No. 397.

The stamens of this last specimen are likewise all biglandular.

Machilus shweliensis, W. W. Sm. Sp. nov.

Species ex affinitate *M. bracteatae,* Lec. et *M. yunnanensis,* Lec. a quibus foliis pluriveniis atque perianthiis sericeis differt; basis inflorescentiae ut in speciebus affinibus, bracteis imbricatis magnis permultis fulvo-sericeis circumdata est.

Arbor 9–12 m. alta ramis glabris nigrescentibus. Folia persistentia petiolo circ. 1.5 cm. longo mox glaberrimo suffulta; lamina vulgo 11–18 cm. longa, 2.5–4 cm. lata, lanceolata vel elliptico-lanceolata, longiuscule acuminata, basi cuneata, coriacea, utrinque glaberrima, supra subnitens, infra paulo pallidior, costa media supra impressa subtus eminente rubida, nervis 16–20 paribus, superficie minute et pulchre reticulata. Inflorescentiae ad apices ramorum plures bracteis imbricatis fulvo-sericeis basi praeditae; paniculae 7–9 cm. longae; ramuli glabri vel glabrescentes; pedicelli 3–5 mm. longi. Perianthii segmenta 4–5 mm. longa lanceolata vel anguste elliptica utrinque sericea. Stamina 9 circ. 3 mm. longa filamentis undique villosulis, eis ordinis tertii glandulis binis cordatis longe stipitatis (stipitibus villosulis) praeditis; antherae ordinis tertii extrorsum dehiscentes; staminodia haud conspicua. Ovarium subglobosum 1.5 mm. diametro stylo gracili 2.5 mm. longo munitum. Fructus globosus 2.5 cm. diametro, perianthii segmentis refractis, tubo haud incrassato.

"West China :—Shweli Valley, Yunnan, in open forests. Lat. 25° N. Alt. 6–7,000 ft. Tree of 30–40 ft. Flowers yellow." G. Forrest. No. 9624.

"Divide between the Shweli and Tengyueh Valleys, Yunnan, in thickets. Lat. 25° N. Alt. 7,000 ft. Tree of 30 40 ft. May 1912." G. Forrest. No. 7908.

Quite distinct from the known Chinese species. In its many-nerved leaves it is akin to *M. odoratissimus,* Nees, but it differs in the large mass of sericeous bracts at the base of the inflorescence (the bracts persisting until the inflorescence is almost completely developed), in the hairy filaments, and in the large fruit an inch in diameter.

Meliosma dumicola, W. W. Sm. Sp. nov.

Species affinis *M. Fischerianae,* Rehder et Wils. a qua foliis oblanceolatis integris subtus praesertim ad costam nervosque pilosulis, petiolis longioribus, inflorescentia terminali, floribus flavidis inter alia divergit.

Frutex ex collectore 9 m. altus; ramuli annotini sat crassi pilosuli tarde glabrescentes. Folia subcoriacea, persistentia, petiolo 2.5–3.5 cm. longo suffulta; lamina 10–13 cm. longa, 3–4 cm. lata, anguste oblanceolata, acuminata, basi anguste cuneata,

integra, supra glabra vel ad sulcum costae nunc minute puberula, saturate viridis, nitens, subtus pallidior sparsim pilosula, ad costam nervosque densius, nervis utrinsecus circ. 8 leviter curvatis omnibus intra marginem anastomosantibus. Paniculae terminales ramulo ex axilla folii supremi persistentis addito, circ. 13 cm. longae, 10 cm. latae, dense fulvo-pilosulae; paniculae ramuli ascendentes. Flores flavidi sessiles vel subsessiles, in axibus ordinis tertii, bracteis ovatis circ. 1.5 mm. longis fulvo pilosulis. Sepala 4-5 imbricata late ovata circ. 1.5 mm. longa ciliolata. Petala exteriora suborbicularia ad 2.5 mm. diametro concava staminibus sterilibus adnatis; interiora duo multo minora oblonga integra vel nunc apice brevissime biloba staminibus fertilibus adnatis, filamentis antheras aequantibus. Discus parvus 5-dentatus. Ovarium glabrum stylo subulato. Fructus deest.

"West China :—Ma-chang-kai Valley, Yunnan, in open thickets. Lat. 25° 20′ N. Alt. 8,000 ft. Shrub of 30 ft. Flowers creamy-yellow. August 1913." G. Forrest. No. 11879.

Ophiopogon grandis, W. W. Sm. Sp. nov.

Inter congeneres rhizomate praelongo crassissimo, scapo valido multifloro, floribus bracteisque pro genere maximis bene notatus.

Planta robusta ad 60 cm. alta rhizomate valde lignoso orta. Caulis epigaeus brevis. Folia numerosissima valde congesta ad 50 cm. longa, 5-6 mm. lata, linearia, acuta, basi petiolatim angustata, textura firma, nervis prominulis. Scapus foliis multo brevior ad 20 cm. longus robustus 12–20-florus. Bracteae ovato-lanceolatae acuminatae atrovirides margine albido-scariosae persistentes inferiores 10-12 mm. longae, superiores sensim decrescentes. Pedicelli ad 5 mm. longi glabri. Perianthii segmenta 11-12 mm. longa erectiuscula alba extra purpurea ovata subacuta. Staminum filamenta vix 1 mm. longa; antherae 6 mm. longae. Stylus 6 mm. paulo superans gracilis.

"West China :—Hills to the east of Tengyueh, Yunnan, in crevices of rocks and cliffs in side valleys. Lat. 25° N. Alt. 6–7,000 ft. Plant of 1–2 ft. Flowers fragrant, creamy-white, flushed purplish-lake on exterior; anthers green. May 1912." G. Forrest. No. 7961.

"Shweli-Salween divide, Yunnan, in shady mixed forests. Lat. 25° 30′ N. Alt. 7,000 ft. Plant of 1–1½ ft. Flowers white. July 1918." G. Forrest. No. 17670.

"Shweli-Salween divide, amongst boulders in shady gullies. Lat. 25° N. Alt. 7,000 ft. Plant of 2 ft. Flowers ? April 1919." G. Forrest. No. 17807.

"Jang-tzow Shan, Shweli-Salween divide, in shady situations in thickets and among boulders. Lat. 25° 10′ N. Alt. 7-8,000 ft. Plant of 12–14 inches. Flowers dull creamy-yellow. August 1919." G. Forrest. No. 18319.

"S.E. Tibet :—Salween-Kiu-chiang divide, Tsarong, on shady, dry banks amongst boulders in ravines and forests. Lat. 28° 40′ N. Long. 98° 15′ E. Plant of 12–20 inches. Flowers fragrant, interior creamy-yellow, exterior brownish-white. July 1919." G. Forrest. No. 19028.

"Upper Burma :—Naung Chaung Valley, in forest under deep shade, damp but not wet places. Alt. 5 9,000 ft. Flowers white. July 1914." F. K. Ward. No. 1723.

4907 **Oxygraphis tenuifolia**, W. E. Evans. Sp. nov.

Species distinctissima, ab omnibus descriptis habitu caespitoso estolonifero, foliis angustissimis longe petiolatis apice integris bene cognita.

Planta 3–6 cm. alta pusilla dense caespitosa glaberrima. Radices numerosae paulo carnosae graciles. Folia omnia radicalia multa cum petiolo 3–6 cm. longa; lamina 10–15 mm. longa, 2 mm. lata, lineari-lanceolata supra in apicem integrum obtusiusculum sensim angustata infra in petiolum complanatum auguste alatum basi membranaceo-expansum contracta. Scapi solitarii vel plures folia fere aequantes simplices aphylli uniflori; in specimine uno scapus supra bifurcatus biflorus bractea foliacea praeditus. Flores 10–12 mm. diametro. Sepala 5–6, virescentia, 2–3 mm. longa, elliptica vel lati-ovata vel suborbicularia, obtusa integra paululo alutacea persistentia. Petala 10–13, flava, 5 mm. longa, circ. 1 mm. lata, ungue 1.5 mm. longo uninervio glandulam prominulam flavidam supra gerente, lamina anguste lanceolata trinervia acutiuscula integra ungue duplo latiore. Stamina haud numerosa ad petalorum unguem plus minusve pertinentia. Carpella sat numerosa sub anthesi 2 mm. longa; ovarium laeve lateraliter compressum; stylus 1 mm. longus fere rectus supra sensim gracilior apice haud hamatus.

"China :—Yunnan, mountains in the N.E. of the Yangtze Bend. Lat. 20° 45′ N. Alt. 13–14,000 ft. Tufted plant of 1–1½ inches. Flowers golden-orange. Moist, stony pasture." Fl. July 1913. G. Forrest. No. 10632.

2314 **Parnassia Cooperi**, W. E. Evans. Sp. nov.

Inter species petalis per totam marginem fimbriato-ciliatis haec tantum cum *P. Davidi*, Franch. est comparabilis; habitu et magnitudine et folio caulino solitario quadrat; petalis angustissimis, staminodiis trifidis lobis lateralibus majoribus late divaricatis in-

termedio multo minore, ovario distincte trigono angulis supra valde carinatis et incrassatis divergit.

Planta 12–16 cm. alta erecta sat gracilis glaberrima. Rhizoma breve paulo adscendens, radicibus fibrosis praeditum, supra foliorum vaginis membranaceis brunneis onustum; caules floriferi 1–2 simplices uniflori paulo supra medium folium unicum gerentes. Folia radicalia pauca petiolo ad 7 cm. longo gracillimo suffulta; lamina late ovata vel orbicularis 1–2.5 cm. diametro apice breviter et obtuse apiculata basi cordata integra in sicco subcoriacea supra atroviridis infra glauca; folium caulinum sessile auriculis basi paulo superpositis amplexicaule caeterum radicalibus simile. Calyx fere ad imum in lobos circ. 6 mm. longos ovato-lanceolatos vel lanceolatos apice truncatos margine integros fissus. Petala 14 mm. longa, 2 mm. lata angustissime lanceolata calycem plus duplo superantia apice saepe bifida infra in unguem angustum 4–5 mm. longum subito contracta margine remotiuscule fimbriato-ciliata nisi ad unguem. Staminodia 5 calycis lobis multo breviora petalorum unguem vix aequantia circ. ad medium triloba, lobis lateralibus late divergentibus latiusculis planis intermedio brevissimo deltoideo-dentiformi. Staminum filamenta vix ad mediam corollam pertinentia; antherae delapsae. Ovarium fere omnino superius globoso-trigonum angulis supra valde incrassato-carinatis; stylus dimidium ovarii fere aequans in lobos angustos patentes trifidus; stigmata recurva apice acuta.

"Sikkim :—Above Toong. Alt. 10,000 ft. White flowers on sandy banks. 18 :9 :13." R. E. Cooper. No. 907 in Herb. Edin.

Parnassia Esquirolii, Lévl. Descr. emend. W. E. Evans.

Species *Parnassiae Faberi*, Oliv. structura atque magnitudine valde affinis; sepalis multo angustoribus vulgo recurvato-patentibus, petalis angustioribus in unguem sensim angustatis, staminodiis anguste linguliformibus planis supra paulo auctis apice integerrimis haud capitatis nec cupuliformibus, stylo distincto recedit.

Planta parvula rosulata glaberrima ad 6 cm. alta. Radices numerosae capillares cum foliis radicalibus in glebam congestae e rhizomate brevissimo repente orientes. Folia omnia integra stipulis filiformibus nigridis integris ad 1 mm. longis munita; radicalia 12–25 patentia arcte rosulata cum petiolo 1–2 cm. longa orbiculari-spatulata vel obovato-spatulata obtusa vel acutiuscula paulo apiculata, laminis 7–15 mm. longis, 5–9 mm. latis in petiolum 2–3 mm. longum saepius sensim angustatis; caulina oblato-orbicularia circ. 3 mm. diametro subsessilia late et obtuse apiculata trinervia. Scapi 3–12 graciles usque ad 6 cm. attin-

gentes uniflori folium caulinum solitarium ad florem plerumque valde approximatum gerentes, raro aphylli. Flores parvi circ. 6–8 mm. diametro; calyx fere ad imum in lobos circ. 4 mm. longos 1 mm. latos lineari-lanceolatos obtusos integros uninervios vulgo recurvato-patentes undulatos fissus, processum capillarem nigridum inter lobos gerens. Petala ad 5 mm. longa, 2 mm. lata, anguste obovato-spatulata plus minusve acutata integra alba in unguem obscurum circ. 1 mm. longum sensim angustata. Staminodia circ. 1.25 mm. longa 0.3 mm. lata ad dimidium staminum attingentia anguste linguliformia applanata haud capitata ad apicem integerrimum obtusissimum haud cupuliformem paulo aucta. Antherae late ellipticae 0.5 mm. longae; ovarium superum sub anthesi conicum, circ. 3 mm. longum, basi 1.5 mm. latum, fructu triangulari-globosum 3 mm. diametro acute trigonum, stylo abbreviato distincto, stigmatibus tribus magnis patentibus. Semina 0.4 mm. longa ovato-elliptica laevia.

West China :—"Kouy-Tchéou. Fleur blanche. Sous arête des rochers humides à Lang-tchang-po. Mai 1910." Jos. Esquirol, No. 3147. (Mgr. Léveillé's type).

"Fleur blanche. Bas des roches, Tchang-tang, Hoang-tsao-pa. Juin 1909." Jos. Esquirol, No. 1574.

"Fleurs blanches. Majo rochers. Juli 1908." J. Cavalerie. No. 2965.

This interesting plant very much resembles *Parnassia Faberi*, Oliv., the chief difference being its very distinct staminodes. As these are not alluded to in the original description in Fedde, Repert. Nov. Sp. Band xiii (1914), p. 258, the present emended description is necessary. The collectors' notes attached to the three gatherings of the plant, all now in Herb. Edin., are also given : in the original description the number of the type is misquoted.

Parnassia Farreri, W. E. Evans. Sp. nov.

Inter species staminodiis integris munitas haec caulibus floriferis simplicibus, petalis niveis infra longe fimbriatis, stigmatibus sessilibus est valde distincta.

Planta 4–10 cm. alta erecta gracilis glaberrima partibus omnibus parvis. Rhizoma verticale breve infra radicibus fibrosis praeditum supra foliorum vaginis membranaceis onustum; caules floriferi 1 rarius 2 simplices uniflori circ. medium folium unicum parvum gerentes. Folia radicalia plura petiolo sat gracili 1–3 cm. longo laminam multo superante suffulta, lamina 2–9 mm. diametro orbiculari apice obtusa basi cordata integra in sicco subcoriacea; folium caulinum radicalibus minus cordato-triangulare amplexicaule. Calyx in lobos circ. 2 mm. longos anguste ovatos obtusos integros profunde fissus. Petala in vivo nivea in

sicco fuscopicta 5 mm. longa spatulata, limbo late elliptico vel subrotundato supra obtuso integro infra longe fimbriato in unguem aequilongum calycem aequantem subito contracto. Staminodia late spatulata plana petalorum unguem haud aequantia, limbo integro supra obscure sinuato ungui subaequilongo atque circ. duplo latiore. Stamina longitudine variabilia ad tertiam partem corollae vel ad duas partes attingentia, filamentis ultra antheras breves latas haud productis. Ovarium late ovatum basi liberum apice breviter contractum, stylo nullo, stigmatibus tribus rectis sessilibus.

"Upper Burma :—Chimili Valley. Alt. 11,000 ft. Flowers white. Characteristic situations in the middle alpine zone. 15.8.19." R. Farrer, No. 1211. Type!

"Imaw Bum. Alt. 12,000 feet. Petals pure white, anthers dull orange. On grassy rocks, ledges and slopes, in black soil. Common and now prominent as there is not much in flower. Grows in patches. 30.8.19." F. Kingdon Ward. No. 3599.

Petrocosmea Wardii, W. W. Sm. Sp. nov.

Species sectionis *Eupetrocosmeae*, Craib, affinis *P. grandiflorae*, Hemsl. a qua habitu multo minore, staminum filamentis brevissimis quam antherae multo brevioribus, antheris ipsis obtuse rostratis recedit.

Herba nana, rhizomate brevi, basi pilis ferrugineis bene induta. Folia omnia radicalia petiolo 1–2 cm. longo pilis longis ferrugineis atque nonnullis brevioribus incanis densissime tomentoso suffulta; lamina majorum in speciminibus nostris circ. 2 cm. longa, ad 1.5 cm. lata, ovata vel subelliptica, apice obtusa vel subrotundata, basi rotundata, margine interdum hic illic denticulata, in sicco tenuiter papyracea, supra densissime incanotomentosa pilis longiusculis ferrugineis intermixtis, infra densissime furfuraceo-tomentosa. Pedunculi plures, uniflori, ad 2.5 cm. alti, pilis longis articulatis patentibus dense cinereo-pilosi. Calyx circ. 5 mm. longus, ut pedunculi dense indutus, in segmenta 5 lineari-lanceolata acuta partitus. Corolla circ. 1.2 cm. longa alba extra minute pilosula; tubus circ. 3.5 mm. longus; corollae labia subaequalia. Stamina fertilia duo, circ. 4 mm. longa, filamentis vix 1 mm. longis minute fulvido-pilosulis, antheris circ. 3 mm. longis in rostrum obtusum excurrentibus, connectivo sub lente valido minute pilosulo. Ovarium cum stylo fere 1 cm. longum pilosulum. Fructus deest.

"West China :—Above the Nam Ting, Yunnan. Lat. 23° 40′ N. Long. 99° 15′ E. Alt. 6,000–7,000 feet. On bare limestone rocks in deep shade of elfin wood, where the ridge ends in a scarp facing east and north. April 23rd 1921." F. Kingdon Ward. No. 3772.

Phoebe Forrestii, W. W. Sm. Sp. nov.

Species affinis *P. neuranthae*, (Hemsl.) Gamble a qua ramulis et pedunculis et perianthiis longe fulvo-villosis, foliis basi anguste rotundatis nec cuneatis inter alia differt.

Frutex 3–6 m. altus ramulis primum longe et densissime fulvo-villosis, annotinis glabris cinerascentibus. Folia saltem ad anthesin persistentia, novella tunc bene evoluta, petiolo 4–6 mm. longo dense fulvo-piloso (in adultis glabrescente) munita; lamina vulgo 8–16 cm. longa, 1.5–3.5 cm. lata, plerumque anguste lanceolata, longiuscule acuminata basi anguste rotundata, adulta firme papyracea vel subcoriacea, supra atroviridis glabra sulco costae pilis fulvis impleto excepto, infra cinerea praesertim ad costam nervosque eminentes subsparsim fulvo-villosa; nervi vulgo 10–14 paria. Inflorescentiae numerosae in axillis superioribus solitariae, pedunculis 3.5–6 cm. longis dense fulvo-villosis gracilibus suffultae 4–8-florae; pedicelli 4–7 mm. longi pilis dense induti. Perianthii segmenta circ. 5 mm. longa ovata obtusa utrinque villosula. Stamina perfecta 9, ea sericrum exteriorum eglandula, antheris quadrilocellatis, filamentis sparsim pilosis, ea seriei tertiae biglandulosa, antheris dorso atque filamentis dense pilosis; staminodia in serie quarta conspicua. Ovarium globosum circ. 1.5 mm. diametro stylum aequans stigmate magno coronatum. Fructus fere maturus subglobosus circ. 12 mm. longus. 10 mm. latus perianthii persistentis segmentis erectis suffultus. perianthii tubo haud incrassato.

"West China :—Valley of the Shweli (Lungchiang), Yunnan, amongst scrub. Lat. 25° N. Alt. 5,000 ft. Shrub of 10–20 ft. Flowers bluish-yellow. May 1912." G. Forrest. No. 7835. "July 1912." G. Forrest. No. 8745.

Of the close allies of this species, *P. neurantha*, Gamble, *P. nanmu*, Gamble, and *P. Sheareri*, Gamble, the first and third occur also in Yunnan, as shown by the Forrestian specimens. *P. nanmu* is common in Szechwan and may also be expected in Yunnan.

Phyllanthus Franchetianus, Lévl. Descr. ampl. W. W. Sm.

Species sectionis *Reidiae*, ex affinitate *P. pulchri*, Wall. a quo ramulis glabris, foliis multo minoribus praeter alia signa differt.

Frutex 1.2–1.3 m. altus ramulis senioribus gracilibus cinereis, junioribus gracillimis glabris a basi ad summum foliis imbricatis praeditis. Folia petiolo brevissimo vix 0.5 mm. superante praedita, 5–7 mm. longa, circ. 3 mm. lata, asymmetrice subelliptica, apice obtuse acutata mucronulata, basi rotundata, in sicco membranacea, glabra, supra glaucescentia, infra glauca nervis subobsoletis; stipulae lineari-lanceolatae acuminatae ad 2 mm.

longae. Flores ut in *P. pulchro* dispositi rubri. Perianthii ♂ segmenta 4, circ. 2 mm. longa, margine lacerata, staminibus 4, antheris sessilibus reniformibus, glandulis haud connatis subquadratis. Perianthium fl. ♀ circ. 5 mm. diametro (vi complanatum); segmenta 6, ovario stylisque eis *P. pulchri* simillimis (ut in Bot. Mag. tab. 5437), glandulis in discum cupularem margine lobatum coalitis.

"Yunnan :—Rives du fleuve Bleu, à Siao-ho; alt. 400 m. Arbuste à feuilles caduques, buissonnant, haut 1.30 m. Fl. rougeâtres, sur le pourtour des feuilles. Drupes vertes, acidulées en forme de cerises. Mai." E. E. Maire in Herb. Lévl.

"Rives du fleuve Bleu à Mong-Kou; alt. 400 m." E. E. Maire. No. 815 in Herb. Edin.

A very graceful plant closely allied to *P. pulcher*, Wall. It may here be noted that *Phyllanthus Mairei*, Lévl. in Bull. Geog. Bot. xxv. (1915), 23=*P. Emblica*, Linn.

Phyllanthus tsarongensis, W. W. Sm. Sp. nov.

Species ex affinitate *P. Clarkei*, Hook. f. et *P. Leschenaultii*, Muell. Arg. et *P. parvifolii*, Ham.; foliis 1 cm. vix superantibus valde approximatis plus minusve oblongis breviter mucronatis, stipulis simplicibus subulatis, floribus pernumerosis breviter pedicellatis, perianthii ♂ et ♀ segmentis sex, staminibus tribus, filamentis in columnam coalitis, stylis tribus, stigmatibus dilatatis deflexis bilobulatis bene notata.

Frutex 2.4–3.6 m. altus ramis senioribus robustis cinereis, ramulis floriferis 6–8 cm. longis gracillimis viridibus glabris a basi ad summum crebre et quasi imbricatim foliosis. Folia petiolo vix 0.5 mm. superante suffulta, membranacea, mediana et superiora in ramulo florifero circ. 1 cm. longa, 5 mm. lata, oblonga, basi rotundata vel paulo cordulata, apice rotundata atque abrupte mucronulata, integra, glaberrima supra laete viridia, infra pallido-olivacea, nervis pagina inferiore conspicuis 5–6-paribus; folia ad basim ramuli minora, nunc 5 mm. longa, 3 mm. lata, saepe ovato-oblonga, infima etiam minora; stipulae subulatae integrae. Flores in axillis foliorum fere omnium 4–6-glomerati, monoeci, parvi, olivaceo-flavi, e dispositione foliorum quasi a rachi folii pinnati dependentes; pedicelli circ. 1 mm. longi glabri bracteis subulatis multo longiores. Perianthii ♂ segmenta 6, circ 1 mm. longa, oblonga, integra; glandulae 6 minimae globosae; stamina 3 perianthium subaequantia, filamentis in columnam coalitis, antheris oblongis majusculis. Perianthii ♀ segmenta 6, eis fl. masculini subsimilia; discus carnosulus cupularis fere integer; ovarium depresso-globosum stylis tribus robustis, stigmatibus apice dilatatis breviter lobulatis decurvis. Fructus deest.

"S.E. Tibet :—Province of Tsarong, Salween-Kiu-chiang divide, in thickets by streams. Lat. 28° 40′ N. Long. 98° 15′ E. Shrub of 8–12 ft. Flowers olive-yellow. July 1919." G. Forrest. No. 18946.

Potentilla eriocarpa, Wall., var. **tsarongensis,** W. E. Evans.

Var. nov.

A typo ramis crassioribus cum squamis 1–2 cm. diametro, foliis junioribus longe albo-sericeis vetustioribus utrinque laxe sed distincte adpresse hirtis, calyce distincte hirto divergit.

"S.E. Tibet :—Tsarong, Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. Loose cushion plant of 2–4 inches. Flowers pale yellow. Ledges and crevices of cliffs and on screes. Fl. July 1919." G. Forrest. No. 19272.

Though both Indian and Chinese specimens of *P. eriocarpa,* Wall. may show slight hairiness of the leaves and even of the calyx, which is described as glabrous, both by Sir Joseph Hooker in Flor. Brit. Ind. ii, 349, and by T. Wolf in Bibl. Bot. Heft. lxxi, 81, the present plant much exceeds any specimens I have seen in this respect, as well as in the peculiarly thickened branches, and seems well worthy of varietal distinction.

Pueraria Forrestii, W. E. Evans. Sp. nov.

Species *Puerariae Lacei,* Craib affinis; foliolis valde latioribus apice obtusissimis margine irregulariter lobatis, racemi pedunculo basi haud bracteato, floribus majoribus, petalorum omnium unguibus multo brevioribus, vexilli apice haud emarginato facile atque certe distinguenda.

Suffrutex late scandens ad 5.5 m. attingens; ramuli 4–6 mm. diametro saepe irregulariter torti patentim ferrugineo-hirsuti Folia pinnatim 3-foliata petiolo 8–12 cm. longo suffulta; stipulae oblongae obtusae 2 cm. longae dense pilosae basi bilobae, lobis linearibus ipsis 1 cm. longis; foliola lateralia irregulariter suborbicularia, terminale oblatum, apice obtusissima basi late rotundata 8–14 cm. longa, 6–8 cm. lata subchartacea, margine irregulariter pauci-lobata lobis (apiceque) longe et tenuissime mucronatis, ciliata tenuiter adpresse sericea subtus pallidiora, nervis lateralibus 5–6 remotis supra conspicuis subtus prominentibus, nervulis transversis subtus distinctis parallelis; petioluli circ. 5 mm. longi, foliolo terminali a lateralibus usque ad 4.5 cm. remoto; stipellae lineares acutae ad 1.5 cm. longae vix 1 mm. latae. Racemi axillares solitarii sub anthesi saepe 20 cm. longitudine excedentes infra (circ. ad 5 cm.) nudi haud bracteati supra multiflori; bracteae lanceolatae vel ovato-lanceolatae circ. 8 mm. longae pilosae deciduae; pedicelli 4 mm. longi apice bracteolis 2 lanceolatis 3–5 mm. longis instructi. Calycis extra longe ferrugineo-hirsuti intus adpresse hirsuti tubus 4–5 mm. longus;

lobi lineari-lanceolati acuti 13 mm. longi, duo supremi in unum latiorem coaliti. Corolla glaberrima longe exserta saturate rosea; vexillum patens suborbiculare apice integrum haud emarginatum basi paulo truncatum atque auriculatum, 1.6 cm. longum, 1.5 cm. latum, ungui brevi 2 mm. longo suffultum; alae irregulariter oblongae basi longe appendiculatae, 1.7 cm. longae, 6 mm. latae, ungui vix 3 mm. longo; carina obtusa 1.7 longa, 5 mm. lata, ungui 3.5 mm. longo. Stamen vexillare ima basi liberum medio cum caeteris connatum; antherae uniformes parvae. Ovarium stipitatum adpresse hirsutum, stylo 5 6 mm. longo glabro, stigmate parvo capitato. Legumen circ. 7 cm. longum, 1 cm. latum, longe et patentim ferrugineo-hirsutum margine sinuatum; semina vix matura pauca reniformia rubronigra ad 9 mm. lata.

"West China :—Yunnan, descent to the Yangtze from the eastern boundary of the Lichiang valley. Lat. 27° 15′ N. Alt. 7–8,000 ft. Scandent plant of 9–12 ft. Flowers purplish-rose. On scrub. August 1913." G. Forrest. No. 10732. In flower. Type !

"Yunnan, Yung-peh mountains. Lat. 26° 40′ N. Alt. 8,000 feet. Scandent shrubby plant of 12–18 ft. Flowers deep rose. Open dry situations in scrub. August 1919." G. Forrest. No. 15312. Flower and fruit.

5109 **Rubus potentilloides,** W. E. Evans. Sp. nov.

Species *Rubo fragarioidei,* Bertol. valde affinis; habitu humili, florum structura, ramis inermibus approximat; foliis anguste et alte multifidis, stylis vulgo brevioribus circ. 2 mm. longis constanter recedit.

Suffrutex pygmaeus repens 3–8 cm. altus. Rami gracillimi ex toto inermes, juniores pilis pallidis patentim pubescentes, vetustiores prostrati radicantes ramos erectos foliosos flore solitario terminatos emittentes. Folia petiolata; petiolus 1–3 cm. longus gracilis pubescens stipulis liberis circ. 3 mm. longis late ellipticis vel suborbicularibus obtusis integris onustus; lamina glabra setis paucis tuberculatis exceptis, ambitu orbicularis, 2 7 mm. diametro, foliolis 5 rarius 3 divergentibus distincte petiolulatis in segmenta cuneata margine profunde et acute angustidentata fere ad costulam fissis. Flos parvus diametro 15–20 mm., pedunculo pubescente 6–12 mm. longo suffultus; calyx intus fere glaber extra pubescens in lobos 4–5 mm. longos suborbiculares (rarius angustiores) vulgo abrupte acuminatos acumine 1 mm. longo nigrescente ad medium divisus; petala nivea 6–7 mm. longa glabra late elliptica integra vel sinuata, apice obtuso vel truncato rarius lobato. Stamina circ. 30 glabra biseriata, exteriora circ. 2 mm. longa, interiora multo minora, filamentis planis e basi gradatim

attenuatis, antheris parvis. Carpella circ. 24 in medio toro aggregata glabra, ovariis sub anthesi 1 mm. longis, stylis circ. 2 mm. longis ad insertionem paulo curvatis parte superiore paulo auctis, stigmatibus truncatis. Achaenia matura ignota.

"Upper Burma :—Naung-Chang—Nwai divide. Alt. 10,000 11,000 ft. Dwarf, with small pure white flowers. Under Bamboo in damp, shady, leafy-soil situations on granite ridge. July 13th 1914." F. Kingdon Ward. No. 1777. Type !

"Valley of the Chang-Maw-Nka. Alt. 8,000-11,000 ft. Dwarf creeper growing in moss on shady banks beneath undergrowth in Bamboo forest, Rhododendron forest, etc. The white flowers stand upright and are quite unprotected. Common all up the granite ridge leading to Imaw Bum to about 11,000 ft. Flowers throughout July. June 3rd 1919." F. Kingdon Ward. No. 3166.

"Chimili Woods. Alt. 10,000 ft. Mossy places in the alpine forest. July 30th 1919." R. Farrer. No. 1132.

A remarkable little plant, in foliage and stature very distinct, though in floral details closely allied to *R. fragaroides*, Bertol. The several gatherings are so constant in their character that it appears certainly a good species. All specimens are in flower only.

45045

Saussurea atrata, W. E. Evans. Sp. nov.

Species *Saussureae Delavayi*, Franch. valde affinis sed caule elatiore crassiore, foliorum inferiorum pagina superiore laxe lanata, foliis supremis purpureo-nigris late lanceolatis haud abrupte acuminatis, receptaculi paleis achenia vix superantibus sat divergit.

Planta robusta circ. 50 cm. alta ex collectore late caespitosa. Radix cum foliis radicalibus ignota. Caules simplices foliosi fistulosi sub capitulis terminalibus arcte congestis ampliati, undique rubidi capillis longis albis laxe lanati. Folia caulina sessilia late linearia, 12 17 cm. longa, 1–1.5 cm. lata, in apicem acutum sensim attenuata, basi decurrentia, margine integra paulo revoluta, supra viridia laxe albo-lanata, infra dense et longe lanata, costa supra conspicua flava infra indumento induta; folia suprema patentia inflorescentiam amplectantia atque ea valde longiora, majora (exteriora) ad 7 cm. longa, 1 cm. lata, omnia late lanceolata in apicem brevem acutum gradatim angustata supra glabrescentia saturate atro-purpurea. Inflorescentia ex capitulis circ. 20 arcte congestis vulgo sessilibus sub anthesi 2 cm. longis 1 cm. latis composita; involucri phylla circ. 4-seriata late lanceolata basi incrassata flavida supra atro-purpurea in apicem longum acutissimum sensim abeuntia extra vulgo pilis longis pallidis conspersa; receptaculi paleae numer-

osae lineari-subulatae achenia vix superantes. Achaenia matura circ. 5 mm. longa 2 mm. lata nigra vel brunnea laevia glabra paulo complanata vix angulata haud rostrata apice truncata; pappi setae rigidae rubro-fuscae subtriseriatae, exteriores breves scabridae, interiores circ. 7 mm. longae plumosae.

"Upper Burma :—Chimili Pass. Alt. 12,000 feet. In big clumps in the open, high-alpine meadows. Flowers and upper leaves of a sombre steely blue-black." Fl. 30 :7 :19. R. Farrer. No. 1135.

Scrophularia chasmophila, W. W. Sm. Sp. nov.

Species affinis *S. Delavayi*, Franch. et *S, alaschanicae*, Batal.; a priore calyce glanduloso-piloso, corolla intra glabra inter alia facile distinguitur; ab altera rhizomate praelongo lignoso, caule plerumque ramoso, foliis utrinque sparsim pilosulis, dimidio minoribus, haud acutis, petiolis inferioribus vix longis, certe superiores plus minusve aequantibus, fasciculis florum in verticillastros 1-4 aggregatis, pedicellis calyces aequantibus, staminodio orbiculari nunc sublineari ex descriptione recedit.

Planta 15–60 cm. alta caulibus vulgo pauciramosis flexilibus glanduloso-pubescentibus infra mox defoliatis, rhizomate nunc valde elongato ad 25 cm. longo. Folia opposita petiolo 5–10 mm. longo pubescente praedita; lamina vulgo 2.5–3.5 cm. longa, 1–2 cm. lata, plus minusve ovata, apice obtusa vel subobtusa, basi lata obliqua abrupte in petiolum angustata, margine pro magnitudine grossidentata, in sicco membranacea, utrinque sparsim pilosula, reticulo nervorum conspicuo. Inflorescentiae terminales glanduloso-pilosae, floribus in verticillastros 1–4 nunc subremotos ad 8-floros aggregatis, pedicellis ad 7 mm. longis densissime glanduloso-pilosis. Calyx 7–9 mm. longus in lobos quinque lanceolatos vel oblongo-lanceolatos obtusos basi haud imbricatos partitus extra pilis glandulosis longiusculis dense obsitus. Corolla circ. 15 mm. longa, 5 mm. lata, extra dense glanduloso-pilosa viridi-flava, tubo fere aequaliter cylindrico 10 mm. longo, lobo summo 5 mm. longo alte bilobo, lobulis sese margine tegentibus, lobis lateralibus et antico tantum 2 mm. longis erectis. Stamina inclusa filamentis minute glanduloso-pilosulis; staminodium nunc orbiculare nunc sublineare. Stylus circ. 7 mm. longus primum sparsim atque minute glandulosus; ovarium glabrum.

"West China :—Mountains in the N.E. of the Yangtze bend, Yunnan, on stony pasture, in rhododendron thickets, and on ledges of cliffs. Lat. 27° 45′ N. Alt. 13,000 ft. Plant of 9–24 inches. Flowers dull green-yellow. July 1913." G. Forrest. Nos. 10380 and 10515.

"Eastern flank of the Lichiang Range, in rocky situations in

rhododendron scrub. Lat. 27° 30′ N. Alt. 14–15,000 ft. Plant of 6–9 inches. In seed. September 1910." G. Forrest. No. 6658.

The species is closely allied to *S. Delavayi*, Franch. and *S. alaschanica*, Batal. It is easily distinguished from the former by the glandular calyx with obtuse lobes. It is nearer to the latter, a plant of Western Mongolia, which I have not seen.

Senecio schizopetalus, W. W. Sm. Sp. nov.

Species sectionis *Ligulariae* atque affinis *S. amplexicauli*, Wall. a quo sociisque ligulis usque ad tubum in segmenta tria fissis inter alia recognoscitur.

Planta robusta 1.2–1.5 m. alta radicibus numerosis ad 15 cm. elongatis cylindricis carnosis praedita. Caulis ad 2 cm. crassus, primum araneoso-fulvido-pubescens, tandem glabrescens. Folia radicalia petiolo ad 70 cm. longo praedita, caulina petiolo 1–5 cm. longo atque vagina ampla foliacea ad 5 cm. longa munita, lamina reniformis, 15–20 cm. longa, 20–25 cm. lata, apice rotundata, basi alte cordata, margine dentibus magnis triangularibus apice induratis subregulariter notata, in sicco membranacea, supra glabra, infra indumento tenuissimo detersili praedita, mox glabrescens. Inflorescentia ampla corymboso-paniculata ad 20 cm. alta, ad 30 cm. lata, ramulis pedunculisque fulvido-tomentellis, bracteis 3–5 mm. longis linearibus, capitulis pernumerosis mediocribus paulo congestis. Involucri phylla circ. 8, oblonga, 8–9 mm. longa, 1–2 mm. lata, subobtusa, nigrida, sparsim tomentella. Flores in quoque capitulo circ. 12 quorum 3–4 ligulati; ligulae circ. 1.5 cm. longae in segmenta tria linearia usque ad tubum fissae; tubus circ. 5 mm. longus; pappus fulvidus 7 mm. longus; achenia immatura 2.5 mm. longa; disci floris corolla circ. 8 mm. longa.

"West China :—Hills east of Tengyueh, Yunnan, amongst scrub and on the margins of streams in gullies. Lat. 25° N. Alt. 6,500 ft. Plant of 4–5 ft. Flowers fragrant, orange-yellow. October 1919." G. Forrest. No. 18611.

799

Sloanea Forrestii, W. W. Sm. Sp. nov.

Species affinis *S. sterculiaceae*, (Benth.) Rehd. et Wils. a qua fructuum indumento inter alia longe differt.

Arbor vel frutex 6–15 m. altus, ramulis primum sparsim pilosis tandem glabris cinerascentibus. Folia petiolo plerumque 2–4 cm. longo sparsim piloso (nunc satis dense) suffulta; lamina vulgo 10–18 cm. longa, 4–8 cm. lata, nonnumquam ad 30 cm. longa, 10 cm. lata, oblongo-lanceolata vel subelliptica vel oblanceolata, apice plus minusve acuminata, basi anguste rotundata vel nunc etiam cordulata, margine subregulariter serratula

nunc in foliis maximis denticulis paucis obscure notata, sub anthesin membranacea, ad dehiscentiam fructuum textura firme papyracea atque tactu aspera, supra glabra, infra primum sparsim pilosa praesertim ad costam et nervos tandem glabrescentia sed nonnunquam indumento molli densiusculo diu persistente subtus munita, costa media nervisque 7–12 paribus infra eminentibus, reticulo nervorum distincto. Pedunculi circ. 2 cm. longi albido-tomentosi. Sepala 4, irregulariter late ovata, paulo imbricata, ad 1 cm. longa, fere 1 cm. lata, indumento denso flavido utrinque induta. Petala irregulariter quadrata circ. 1 cm. longa et lata, apice grossidentata, utrinque plus minusve dense pilosula. Stamina numerosissima antheris 3 mm. longis acutatis minute puberulis, filamentis 4 mm. longis puberulis. Discus crassus indumento tenui indutus staminum insertionibus conspicuo foveolatus. Ovarium quadriloculare tomentosum 3 mm. longum stylo subulato ad 7 mm. longo ad medium puberulo. Fructus lignosus cum setis ad 5 cm. diametro; setae circ. 2 cm. longae debiles haud subulatae nec apice spinosae, basi ad apicem setulis hispidae, post dehiscentiam fructuum persistentes; loculi muris crassissimis circ. 2 cm. longi, 1 cm. lati; semina in loculis solitaria oblonga circ. 1 cm. longa, 5 mm. lata nigra nitentia, fere ad medium arillo viridi-flavido margine eroso circumdata.

"West China :—Shweli-Salween divide, Yunnan, in mixed forests. Lat. 25° N. Alt. 7–8,000 ft. Shrub or tree of 30–50 ft. In fruit. April 1919." G. Forrest. No. 17795.

"Eastern flank of the N'Maikha-Salween divide, Yunnan, in open forests. Lat. 26° N. Alt. 8,000 ft. Duplicate of 17795 in flower. Flowers soft yellow. May 1919." G. Forrest. No. 17884.

"Lava bed west of Tengyueh, Yunnan, in open situations on the outskirts of the bed. Lat. 25° N. Alt. 5,000 ft. Shrub or tree of 20–40 ft. In fruit. July 1912." G. Forrest. No. 8535.

"Shweli-Salween divide, Yunnan, in forests. Lat. 25° 6′ N. Alt. 7–8,000 ft. Shrub or tree of 20–50 ft. Flowers green-yellow. April 1917." G. Forrest. No. 13656. Also Nos. 16240, 18032, 18390.

Staphylea Forrestii, Balf. f. Sp. nov.

Species affinis *S. holocarpae*, Hemsl. a qua fructibus cylindrico-campanulatis inter alia differt; a *S. Emodi*, Wall. foliolis lateralibus distinctius petiolulatis, petiolis brevioribus, floribus ex ramulis annotinis ortis, capsulis basi latiusculis, seminibus multo minoribus recedit.

Arbor 10–17 m. alta; ramuli glabri. Folia (adulta tantum visa) 3-foliolata, raro 5-foliolata, petiolo 4–9 cm. longo glabro

suffulta; foliola subaequalia 7–10 cm. longa, 3.5–4.5 cm. lata, oblonga-elliptica apice longiuscule acuminata, basi plus minusve late cuneata, textura crasse papyracea, fere ad basim subregulariter serrata, supra atroviridia glabra, infra pallidiora basi ad axillas nervorum sparsim albo-villosula ceterum glabra; nervi utrinque 6–7 sat conspicui; petioluli laterales 2–3 mm. longi, medianus 2.5–3.5 cm. longus. Flores desunt. Fructus 4.5–6.5 cm. longus, 2–3 cm. latus, cylindrico-campanulatus basi rotundatus vix angustatus. Semina circ. 7 mm. longa nitentia olivacea.

"West China :—In open forests on the Tong Shan, Yunnan. Lat. 27° 20′ N. Alt. 9,000 ft. Tree of 30–50 ft. Flowers said to be crimson ? In fruit. August 1914." G. Forrest. No. 13344.

The nearest relative of this species is *S. holocarpa,* Hemsl. from which it differs in the leaf characters and the fruit. The seed is somewhat larger than in that species, but much smaller than that of the West Himalayan *S. Emodi,* Wall. The alleged colour of the flower is very doubtful.

Staphylea shweliensis, W. W. Sm. Sp. nov.

Species valde affinis *S. Emodi,* Wall. a qua foliolis petiolisque minoribus, foliolis lateralibus bene petiolulatis, floribus multo minoribus praeter alia signa recedit.

Arbor parva vel frutex 6–9 m. altus; ramuli glabri. Folia cum floribus subcoetanea trifoliolata, petiolo vulgo 4–6 cm. longo glabro praedita; stipulae conspicuae ad 2.3 cm. longae lineari-lanceolatae membranaceae; foliola subaequalia vulgo 6–8 cm. longa, 3–3.5 cm. lata, plus minusve elliptica, apice longiuscule et acutissime acuminata, basi plus minusve late cuneata, textura membranacea, regulariter glanduloso-serratula saepius tantum ad medium, supra viridia glabra, infra subglauca glabra; nervi utrinque 5–6 subconspicui; petioluli laterales circ. 3 mm. longi, medianus circ. 1.5 cm. longus. Inflorescentiae ramulos annotinos terminantes 20–30-florae 5–6 cm. longae; pedunculus 4–6 cm. longus; pedicelli circ. 8 mm. longi; bracteae lineares 2–3 mm. longae. Flores ex collectore pallido-flavi. Sepala circ. 6 mm. longa oblonga. Petala obovata calycem subaequantia. Staminum filamenta sparsim pubescentia. Styli in speciminibus dissectis duo cum ovario sparsim et longiuscule villosuli. Fructus deest.

"West China :—Shweli-Salween divide, Yunnan, in thickets. Lat. 25° 20′ N. Alt 9,000 ft. Shrub of 20–30 ft. Flowers creamy-yellow, brown on exterior. July 1917." G. Forrest. No. 15800.

Closely allied to *S. Emodi,* Wall. this species differs in the

smaller glandular-serrulate leaves and much smaller flowers.

Strobilanthes aenobarbus, W. W. Sm. Sp. nov.

Species affinis *S. cyphanthae,* Diels et *S. yunnanensi,* Diels sed caulibus petiolisque longe fulvido-hirsutis, foliis majoribus in sicco tenuiter membranaceis inter alia differt; etiam affinis est *S. rufohirtus,* Clarke qui foliis multo minoribus et indumento diverso recedit.

Planta 60–75 cm. alta erecta subrobusta ramosa. Caules supra pilis fulvidis longis articulatis dense induti, infra glabrescentes atro-virides. Folia petiolo 3–5.5 cm. longo latiuscule alato densissime fulvo-hirto praedita; lamina vulgo 15–21 cm. longa, 7–10.5 cm. lata, ovata vel subelliptica, apice caudato-acuminata, basi late cuneata vel subrotundata, in petiolum alatum abrupte angustata, margine ciliolata regulariter serrato-crenata, crenaturis indurato-apiculatis, in sicco tenuiter membranacea, supra atroviridis setulis vesiculosis conspersa, ad costam eminentem fulvido- vel albido-setosa, ceteroquin sparsim setosula; nervi 8–9· paria. Inflorescentiae terminales et in axillis foliorum superiorum pedunculatae. Flores sessiles; bracteae lanceolatae vel ovato-lanceolatae foliaceae vulgo serratae. Calyx 10–11 mm. longus in lobos lineares vel lineari-spathulatos margine scariosos ad partem dorsalem pilis albidis glanduloso-capitatis indutos fere ad imum fissus. Corolla 3 4 cm. longa lavandulaceo-purpurea, multo curvata ad modum *S. cyphanthae;* tubus basi breviter cylindricus mox ventricoso-ampliatus extra sparsim pilosulus; lobi rotundati circ. 6 mm. diametro. Stamina perfecta 4, filamentis supra glabris infra albovillosulis, polline typico. Stylus apice ad basim pilis glandulosis sparsim praeditus. Fructus deest.

"S.E. Tibet :—Salween-Kiuchiang divide, Tsarong, in shady situations by streams and on the margins of thickets. Lat. 28° 40′ N. Long. 98° 15′ E. Alt. ? Plant of 2–2½ ft. Flowers pale lavender-purple. August 1919." G. Forrest. N. 19238.

Symplocos Forrestii, W. W. Sm. Sp. nov.

Species affinis *S. sumuntiae,* Buch.-Ham. et *S. botryanthae,* Franch. a quibus floribus remotiusculis brevissime pedicellatis inter alia recognoscitur.

Frutex 2–3 m. altus. Ramuli graciles glabri, seniores cinerascentes lenticellis obscuris. Folia petiolo 1.5–2 cm. longo praedita; lamina plerumque 9–12.5 cm. longa, 3.5–5 cm. lata, oblonga vel elliptica apice longiuscule acuminata, basi cuneata, in parte

superiore minute serrulata, tenuiter coriacea, glaberrima, supra opaco-viridis vel nunc nitidula, infra paulo pallidior; costa media supra impressa, infra multo eminens, nervis venulisque subconspicuis. Inflorescentiae 5–9 cm. longae, in axillis superioribus numerosae, erectae, rigidiusculae, ad 15-florae, pilis ferrugineis sparsim indutae, floribus remotiusculis, pedicellis vix 1 mm. longis calyce brevioribus. Calycis tubus ovoideus circ. 2 mm. longus glaber lobis ovatis obtusis 1 mm. vix aequantibus. Corolla ad 6 mm. longa flava. Stamina circ. 50, in spec. nostris corolla subbreviora. Fructus, si Forrest num. 8241 huc recte allocatus, circ. 6 mm. longus, ovoideus vel breviter cylindricus, brunneus.

"West China:—Shweli-Salween divide, Yunnan, in thickets. Lat. 25° 20′ N. Alt. 10,000 ft. Shrub of 6–10 ft. July 1917." G. Forrest. No. 15653.

"Divide between the Shweli and Tengyueh Valleys, Yunnan, amongst scrub. Lat. 25° N. Alt. 6–7,000 ft. Shrub of 6–12 ft. In fruit. June 1912." G. Forrest. No. 8241.

Among the species of the subsection *Lodhra* with racemose inflorescence, the above comes nearest to *S. sumuntia*, Buch.-Ham. The inflorescence is almost spicate but the species is far removed from *S. khasiana*, Brand and its allies.

Teucrium holocheilum, W. E. Evans. Sp. nov.

Inter Teucria indo-chinensia haec corollae labio inferiore integro distinctissima est.

Planta repens; caules vetustiores prostrati ad nodos radicantes, ramos floriferos erectos vel decumbentes longitudinaliter sulcatos patenti-glanduloso-villosos (ad 50 cm. attingentes) emittentes. Folia opposita late cordiformia longe petiolata; petiolus 3–4 cm. longus; lamina 3–5 cm. longa, 2.5–5 cm. lata, apice obtusa basi leviter cordata margine regulariter crenata, lobis anterioribus majoribus, parce et adpresse hirsuta. Inflorescentiae breves cymosae axillares laxae corymbiformes 7–13-florae pedunculo petiolum aequante nudo ubique plus minusve glanduloso-hirsuto suffultae; florum pedicelli 2–4 mm. longi ad basim bi-bracteati bracteis viridibus ovatis lanceolatisve integris vel apice paucidentatis saepe basi connatis. Flores mediocres. Calycis viridis tubus campanulatus inconspicue quinquinervius sub anthesi circ. 5 mm. longus, ore obliquo quinquidentato, dentibus anguste triangularibus subaequalibus acutis 2 mm. longis. Corollae roseo-marmoratae tubus anguste cylindricus longe exsertus circ. 11 mm. longus; labium superius valde reductum integrum, inferius concavo-spathulatum 6 mm. longum integrum. Stamina quatuor 2–3 mm. exserta anteriora longiora stylum apice bifidum aequantia. Ovarium glabrum 4-lobatum receptaculo

aucto suffultum, nuculis junioribus glabris nigrescentibus profunde reticulato-foveolatis.

"China :—Yunnan, Shweli-Salween divide. Lat. 25° 40′ N. Alt. 9–10,000 feet. Plant of 6–12 inches. Flowers rose, mottled a deeper shade. Shady pasture on the margin of thickets. June 1919." G. Forrest. No. 18086. In flower.

Thalictrum scaposum, W. E. Evans. Sp. nov.

Inter congeneres filamentis valde dilatatis achaeniis longe stipitatis stylis nullis notatos species haec foliolis haud peltatis, caulibus sub-scaposis aphyllis folia aequantibus, achaeniis parvis fere rectis distinguenda est.

Planta glaberrima circ. 15–20 cm. alta. Rhizoma perenne repens curtum, folium radicale unicum atque inflorescentiam breviter subscaposam gerens. Folium biternatum cum petiolo 10 cm. longo circ. 15–20 cm. longum, foliolis ad 4 cm. longis 3 cm. latis longe petiolulatis subtus glaucescentibus late ovatis vel orbiculari-ovatis obtusis basi cuneatis vel subtruncatis margine irregulariter 3–4-lobatis, lobis latis obtusis. Scapus brevis pauciflorus folium subaequans inflorescentia circ. 10-flora subumbellata terminatus atque vulgo inflorescentiam secundariam, ex axilla bracteae parvae viridis trifoliolatae ortam, primariae similem et eam superantem prope apicem emittens. Flores parvi; sepala lactea haud 2 mm. excedentia ovato-lanceolata obtusa integra; stamina circ. 8, circ. 3 mm. longa, filamentis infra angustatis parte superiore magis dilatatis, antheris parvis parallelis. Achaenia staminibus pauciora longe stipitata, juventute erecto-patentia stigmatibus sessilibus parvis capitata, maturitate parva, vix 2 mm. longa, 0.75 mm. lata, fere recta haud alata nec compressa longitudinaliter et aequaliter 8-sulcata.

"West China :—Yunnan, Mekong-Salween divide. Lat. 26° 40′ N. Alt. 10,000–11,000 ft. Plant of 6–10 inches. Flowers creamy-white. On cliffs and humus-covered boulders. July 1919." G. Forrest. No. 18194. In flower. Type !

"Upper Burma :—Ridge West of Hpimaw Village. Alt. 9,000–10,000 ft. In shade on limestone cliffs, amongst moss, damp places." F. Kingdon Ward. No. 1759. July 9th 1914. Mature fruit.

An interesting plant, having the foliage of *T. clavatum*, DC. but quite distinct in the short subscapose, few-flowered inflorescence and much smaller, straighter achenes. It is also distinct from the numerous species described by Mgr. Léveillé, with the types of which it has been compared.

A New Chelonistele from Mt. Kinabalu, Borneo.

Chelonistele Keithiana, W. W. Sm. sp. nov.

Species affinis *Ch. sulphureae*, (Bl.) Pfitz. et *Ch. tenuiflorae*, (Ridl.) Pfitz. a quibus labelli lobis longiusculis erectis inter alia recedit.

Pseudobulbi cylindracei laeves, juniores vaginis multis ovatis acutiusculis textura firme papyraceis bene circumcincti atque celati, in rhizomate valido approximati, diphylli, ad 8 cm. longi, 2.5 cm. lati. Folia petiolo valido ad 5 cm. longo munita; lamina 10–15 cm. longa, 3–3.5 cm. lata, anguste oblonga, apice acutata, coriacea. Scapus proteranthus, ad anthesin foliis tantum semi-evolutis, erectus, multiflorus, ad 25 cm. longus, folia etiam matura paulo superans; bracteae circ. 1 cm. longae cito deciduae angustae subscariosae. Sepala subaequalia circ. 1 cm. longa, 5 mm. lata, oblonga, obtusiuscula, ad basim saccata, extus carinata. Petala circ. 1 cm. longa, 1 mm. lata, ligulato-linearia, circinato-reflexa. Labellum 1 cm. paulo superans, sigmoideo-flexum, basi latiuscula gynostemio affixum trilobum; lobi laterales pro genere magni circ. 4 mm. longi lineari-oblongi erecti atque gynostemio subparalleles acuti ad latera interiora basi auriculo distincto muniti; lobus medius ascendens ex isthmo lato spathulato-dilatatus bilobulus; carinae obsoletae. Gynostemium e basi angustiore alato-dilatatum circ. 6 mm. altum, conchiforme, ala apice obscure bilobatula margine erosula; stigma suborbiculare margine producto. Ovarium fere 5 mm. longum subtrigonum pedicello 7–8 mm. longo suffultum. Ex collectore flos flavidus, medio albus.

"Borneo :—Mount Kinabalu, at an altitude of 7,200 feet. 28th August 1913." J. C. Moulton. No. 103.

The specific name is in memory of Mr P. Skene Keith, an officer in the service of the British North Borneo Company, who accompanied Mr Moulton on his ascent of Mt. Kinabalu and who lost his life in Borneo shortly after his return from the expedition. I am indebted to Mr R. A. Rolfe of Kew for the reference of the species to its proper affinity.

W. W. Smith.

New Orchids from Yunnan and Northern Burma

BY

W. W. SMITH, M.A.

THE orchids described in the following pages were collected chiefly in the temperate and sub-alpine areas of S.W. Yunnan and the Burmo-Chinese frontier. The greater part of the material was obtained by Mr George Forrest and the remainder by Captain Kingdon Ward and the late Mr Reginald Farrer. I have omitted reference to species previously recorded from Yunnan and Burma respectively, but in addition to the new species I have made note of orchids not previously found in these areas. The number of species added to the flora of the area—whether new species or new records—is considerable. This may be accounted for in the first place by the close affinity of the flora of that portion of Yunnan centring round Tengyueh with the flora of Upper Burma. Many well-known Burmese orchids are represented in this corner of China and are not found further north or east. A huge lava-bed near Tengyueh at an elevation of some 5,000 feet—overgrown by a dense matted jungle of shrubs and climbers—was found by Forrest to be rich in Orchideae of pronounced Burmese affinity. Further the sub-alpine flora of the Burmese frontier is little known and ground orchids appear to form a considerable element thereof. The specimens obtained from the frontier by Kingdon Ward and Farrer indicate that genera such as *Habenaria* have a development there akin to what obtains in the Eastern Himalaya. What has been found already on the Burmese side of the frontier can represent only a tithe of the alpine orchid flora of the area. As may be expected there are species common to the area and to Yunnan, as well as species common to the area and the East Himalaya. Interesting extensions eastwards are *Risleya atropurpurea*, King et Pantling, from the East Himalaya, *Eriodes barbata*, Rolfe, from the Khasias, *Habenaria urceolata*, Clarke, from the East Himalaya and the Khasias.

The paper may be looked upon as supplementary to previous papers on the Orchideae collected by Forrest. The orchids obtained by Forrest during his expeditions in the years 1904–05 were dealt with by Mr Rolfe in the Notes R.B.G. Edin., viii. (1913), pp. 19–29. Those resulting from the explorations of the year 1906 were identified and described by Dr. Schlechter in the

[Notes, R.B.G., Edin., Nos. LXIII-LXIV, November 1921.]

same publication Vol. v. (1912) pp. 93–113. The present paper deals with the collections of the years 1912–1914 and 1917–1919.

The writer had the pleasurable anticipation of the co-operation of Mr R. A. Rolfe in the elucidation of the present series but to the great regret of all who knew him Mr Rolfe died on 13th April 1921. All that was accomplished together was two days' survey of the series, employed in comparison of the specimens with the types at Kew. This served to eliminate the majority of the known species which was all that could be done at the time. Consequently for any errors in identification or description in what follows the present writer is responsible.

26089 **Bulbophyllum hyacinthiodorum**, W. W. Sm. Sp. nov.

Species affinis *B. odoratissimo*, Lindl. a quo inflorescentiis oblongis haud globosis, floribus majoribus, sepalis 5-nerviis divergit; in *B. congesto*, Rolfe flores multo minores sunt.

Planta repens rhizomate 60–90 cm. longo. Pseudobulbi 8–10 cm. inter se distantes, circ. 4 cm. longi, circ. 6 mm. lati, anguste oblongi, monophylli. Folia vulgo 6–7 cm. longa, 1.2–1.6 cm. lata, oblonga, apice subrotundata et breviter retusiuscula, basi breviter petiolatim angustata, in sicco coriacea. Scapus ad 10 cm. altus, folia plerumque paulo superans, vaginis circ. 4 ovato-lanceolatis circ. 1 cm. longis subappressis acutis munitus; racemus 2–3 cm. longus multi- et densiflorus, bracteis 1 cm. longis lanceolatis acutis acuminatisve subpatentibus albidis bene ornatus. Pedicelli 5–6 mm. longi. Flores albi, nonnunquam viridi-tincti, fragrantissimi. Sepala lateralia patentia circ. 1 cm. longa, basi 2.5 mm. lata ibique 5-nervia, mox angustata et baculiformia, marginibus cujusque sepali involutis et cohaerentibus, obtusa glabra, textura tenuiter membranacea; sepalum dorsale subsimile circ. 7 mm. longum minus obtusum. Petala vix 2 mm. longa, tenuissima, ovata, obtusa, integra, glabra. Labellum parvum, tantum 1.5 mm. longum, ad pedem columnae adnatum, mobile, linguiforme, recurvatum, glabrum. Columna brevis fere 1.5 mm. alta, late alata, apice biapiculata. Anthera bilocularis polliniis 4 quorum duo majora.

"West China :—Lava bed west of Tengyueh, Yunnan. Epiphytic on trees and rocks. Lat. 25° N. Alt. 5,000 ft. Trailing plant of 2–3 ft. Flowers pure white or slightly tinged green; strongly fragrant. Fragrance identical with that of Roman hyacinths. May 1912." G. Forrest. No. 7987.

Bulbophyllum reptans, Lindl.

"West China :—Shweli-Salween divide, Yunnan. Epiphytic on trees and rocks in shady side valleys. Lat. 25° N. Alt.

8–9,000 ft. Plant of 3–5 inches. Flowers pale yellow, brownish at base. April 1919." G. Forrest. No. 17,822.

New to China.

Bulbophyllum shweliense, W. W. Sm. Sp. nov.

Species affinis *B. radiato,* Lindl. a quo floribus fere sessilibus inter alia differt; a *B. cauliflore,* Hook. f. rhizomate gracili, petalorum forma praeter alia signa removitur; a *B. protracto,* Hook. f. valde affini pedicellis subnullis, bracteis ovaria longe superantibus, petalis trinerviis distinguitur; in *B. odoratissimo,* Lindl. petala minima uninervia; *B. leptanthum,* Hook. f. et *B. Gamblei,* Hook. f. autem affines, petalis viridulis uninerviis separantur.

Planta pusilla rhizomate repente gracillimo. Pseudobulbi 10–15 mm. longi, 4–5 mm. lati, 3–5 cm. inter se distantes, oblongi, monophylli. Folia plerumque 3 cm. longa, 1 cm. lata, oblonga, apice rotundata et breviter retusa, basi brevissime petiolatim angustata, in sicco firme papyracea. Scapus ad 4–5 cm. altus flexuosus gracillimus bracteis 2–3 remotis vaginiformibus praeditus; racemus in capitulum 5–10-florum circ. 1 cm. diametro compactus; bracteae florales 10–12, albidae, 3–4 mm. longae, lanceolatae, acutae, concavae, tenuissime membranaceae. Flores aurantiaco-flavi subsessiles. Sepala circ. 7 mm. longa lanceolata longe acuminata trinervia. Petala circ. 3.5 mm. longa, subelliptica, brevissime acutata, trinervia, glabra. Labellum petala subaequans, linguiforme, curvatum, marginibus erectis, pedi circ. 1.5 mm. longo affixum, glabrum. Columna brevis alis parvis acutis. Anthera bilocularis polliniis 4 quorum duo minima.

"West China:—Shweli Valley, Yunnan, on trees and rocks. Lat. 24° 40′ N. Alt. 5–6,000 ft. Epiphytic plant of 1½–2½ inches. Flowers golden-yellow. August 1919." G. Forrest. No. 18,398.

Calanthe amoena, W. W. Sm. Sp. nov.

Species affinis *C. puberulae,* Lindl. a qua habitu multo robustiore, floribus flavidis, petalis linearibus uninerviis differt.

Planta terrestris erecta 40–50 cm. alta rhizomate brevi radicibus elongatis pilosis bene praedito. Folia basalia circ. 6, basi fibris solutis circumdata, sub anthesin satis bene evoluta, plus minusve elliptica, ad 25 cm. longa, ad 8.5 cm. lata, apice acuta vel acuminata, basi petiolatim angustata, plicata, in sicco membranacea, utrinque glabra. Scapus erectus, folia longe superans, foliis reductis bracteiformibus lanceolatis 2–3 ornatus, flores circ. 15 gerens, minute pubescens; inflorescentia infra laxa

supra sat densa; bracteae persistentes ad 2.5 cm. longae, erecto-patentes, lineares vel sublineares acutissimae membranaceae in sicco brunneae; flores mediocres; pedicelli longiusculi inferiores 1.5–2 cm. longi minute pubescentes. Sepala lateralia circ. 1.8 cm. longa, 6 mm. lata, patentia, falcato-ovata, longiuscule acuminata, glabra, flava; intermedium paululo brevius ovatum longe acuminatum. Petala circ. 1.4 cm. longa, 1 mm. lata, linearia, uninervia, acutissima, flava. Labellum columnae adnatum, circ. 1.4 cm. longum, trilobum, lobis lateralibus quadrato-oblongis 5 mm. longis apice 4 mm. latis integris, lobo intermedio breviter stipitato late obovato apice 7 mm. lato, breviter emarginato et distincte mucronato ad latera eroso, parte inter lobos lateriales lineis tribus in isthmum productis indistinctis pererrata; calcar nullum. Columna carnosa 5 mm. alta; pollinia 8. Ovarium sublineare pedicello brevius 12 13 mm. longum minute puberulum.

"West China :—In the Minkwong Valley, Yunnan, in open, stony situations. Lat. 25° 20′ N. Alt. 6,500 ft. Plant of 16–20 inches. Ovary pale, dull rose-purple. Sepals dull maize-yellow, flushed pale, dull purple on exterior. Petals dull maize-yellow, labellum same, deepest towards base where slightly touched crimson on exterior. Aug. 1912." G. Forrest. No. 8867.

Calanthe arcuata, Rolfe.

A form of this species extends into Yunnan :—

"On the Tong-Shan, Yunnan, in open situations on the margins of thickets. Lat. 27° 20′ N. Alt. 8–9,000 ft. Plant of 9–14 inches. Flowers pale rose. August 1919." G. Forrest. No. 13107.

Closely allied and probably also a form of the same species are :—

"Upper Burma :—Naung-Chaung Valley, at 8,000 ft. in shade of forest, in leafy soil. Terrestrial orchid with brownish-yellow flowers. July 1914." F. K. Ward. Nos. 1654, 1696, 1721.

Calanthe lepida, W. W. Sm. Sp. nov.

Species valde affinis *C. puberulae*, Lindl. et *C. amoenae*, W. W. Sm. supra descriptae; ab hac floribus roseis labello diverso recedit; ab illa habitu robustiore, scapo pedicellisque floribusque glaberrimis, labello fere ecalloso divergit. Pro varietate *C. puberulae* fortasse rectius aestimanda.

"S.E. Tibet :—Salween-Kiuchiang divide, province of Tsarong, in shady situations amongst grass on the margins of thickets. Lat. 28° 40′ N. Long. 98° 15′ E. Plant of 14–15

inches. Flowers rose, labellum darkest. August 1919." G. Forrest. No. 19,063.

Calanthe plantaginea, Lindl.

"West China :—Hills to the south of Tengyueh, Yunnan, in shady openings in thickets. Lat. 25° N. Alt. 6–7,000 ft. Plant of 1–1½ ft. Flowers rose and dull yellow. March 1913." G. Forrest. No. 9738. Also No. 12,294.

"Upper Burma :—Langyang Pass at 7,500 ft., on woodland banks coming down from the pass. April 1919." R. Farrer. No. 827.

Not previously recorded, I believe, from China or Burma.

Calanthe shweliensis, W. W. Sm. Sp. nov.

Species affinis *C. angustae*, Lindl. et *C. Davidi*, Franch. et *C. ensifoliae*, Rolfe; inflorescentia pro numero florum breviuscula, lobo labelli alte bifido inter socios illos bene notata.

Planta terrestris erecta 30–60 cm. alta rhizomate brevi radicibus elongatis pilosis bene praedito. Folia basalia vulgo 3–4, basi fibris solutis circumdata, sub anthesi satis bene evoluta, anguste lanceolata, ad 20 cm. longa, 1.5–2.5 cm. lata, apice acuta vel acuminata, basi petiolatim angustata, plicata, in sicco membranacea, utrinque glabra. Scapus folia longe superans, flores 12–20 subcongestos gerens, ubique minute pubescens, foliis reductis bracteiformibus 4–6 remotis ornatus; inflorescentia 7–8 cm. longa, 4–6 cm. lata; bracteae persistentes ad 1 cm. longae, ad 5 mm. latae, subpatentes, ovato-lanceolatae, obtusiusculae, textura subfoliaceae; flores mediocres; pedicelli circ. 5 mm. longi. Sepala lateralia circ. 1.2 cm. longa, fere 5 mm. lata, patentia, oblique ovata, obtusa, glabra, flava; intermedium ovatum paulo brevius. Petala paulo minora sepalis subsimilia. Labellum columnae adnatum, circ. 1.2 cm. longum, trilobum, lobis lateralibus oblongis 5 mm. longis 2 mm. latis integris, lobo intermedio late obovato ad medium in lobulos obovatos 6 mm. longos 5 mm. latos integros apice rotundatos diviso; calcar 9 mm. longum sublineare fere rectum subacutum. Columna carnosa 5 mm. alta; pollinia 8. Ovarium subclavatum 1.3 cm. longum minute puberulum.

"West China :—Valley of the Shweli (Lungchiang), Yunnan, on margins of thickets. Lat. 25° N. Alt. 5,000 ft. Plant of 1–2 ft. Flowers biscuit-yellow with a tinge of pink or lavender on exterior; fragrant. May 1912." G. Forrest. No. 7824.

A very distinct member of the group which contains *C. Davidi*, Franch. and *C. ensifolia*, Rolfe.

Calanthe Wardii, W. W. Sm. Sp nov.

Species ex affinitate *C. angustae*, Lindl. a qua labello latiore quam longiore inter alia facile recognoscitur.

Planta terrestris erecta, in speciminibus nostris circ. 70 cm. alta sed ex collectore ad 120 cm., rhizomate crasso radicibus elongatis pilosis praedito. Folia basalia circ. 4, basi fibris solutis circumdata, sub anthesi satis bene evoluta, anguste lanceolata, 40–45 cm. longa, plus minusve 3 cm. lata, apice longe acuminata, basi longe petiolatim angustata, plicata, in sicco firme membranacea, utrinque glabra. Scapus folia longe superans, valde robustus flores 10–20 laxe dispositos gerens, ubique minute pubescens, foliis reductis bracteiformibus paucis basi amplexicaulibus ornatus; pars florifera circ. 15 cm. longa; bracteae persistentes ad 2.5 cm. longae, lineares vel sublineares, acutae, sub anthesi deflexae; flores mediocres; pedicelli 3–4 mm. longi. Sepala lateralia 10–11 mm. longa, 3.5 mm. lata, patentia, oblique ovata, obtusa, breviter apiculata, glabra; intermedium subsimile ovatum. Petala anguste lanceolata, 9 mm. longa, 2 mm. lata, acuta. Labellum (ut sepala petalaque) valde carnosa, columnae adnatum, circ. 7 mm. longum, circ. 11 mm. latum, lobis lateralibus fere obsoletis, lobo intermedio in formam securis bipennis constructo, margine integro, apice late exciso, lamellis elevatis tribus pererrato; calcar 9–11 mm. longum lineari-oblongum obtusiusculum. Columna carnosa brevis; pollinia 8. Ovarium subclavatum circ. 8 mm. longum minute pubescens.

"Upper Burma :—Hpimaw in shady forest, damp humus soil, at 7,000 ft. Flowers greenish-yellow; height of plant about 4 ft. June 1914." F. K. Ward. No. 1661.

"In the Naung-Chaung Valley in open places, at 10,000 ft. Flowers bright sulphur-yellow, fragrant. July 1914." F. K. Ward. No. 1734.

"Hpimaw; Alt. 7,000 ft. June 1919." Farrer. No. 1040.

The species has the habit of *C. Davidi*, Franch. It is well distinguished from its allies by the twin-axe-headed shape of the labellum.

Calanthe yunnanensis, Rolfe.

"Upper Burma :—Htawgaw, valley of Naung-Chang, Lashi country. Terrestrial orchid growing in leaf mould etc. in damp deep shade of rain forest at 8,000 ft. Petals green, labellum purplish-red. Flowers pointing down completely as protection against rain. Masses in the forests of Teng-shui-ling, grown in big colonies on dead tree trunks, on humus, etc. in deep shade, not in very wet places. May 1914." F. K. Ward. No. 1606.

"Ngaw Chang Woods. Alt. 5,000 ft. Flowers greenish. May 1919." E. H. M. Cox. No. 1010.

Cirrhopetalum aemulum, W. W. Sm. Sp. nov.

Species valde affinis *C. cornuto*, Lindl. a quo sepalo dorsali integro eciliolato, petalis minute erosulis vix ciliolatis, floribus flavidis divergit.

Rhizoma validum repens squamis membranaceis indutum. Pseudobulbi numerosi 3-4 cm. longi, ovoidei, monophylli. Folia 7-17 cm. longa, 1.5–2.8 cm. lata, oblonga, apice brevissime retusa, coriacea, petiolo ad 3 cm. longo munita. Scapus folia semiaequans vel nunc ad 20 cm. attingens, gracilis, bracteis 2–3 vaginiformibus remotis praeditus, vulgo 6–15-florus, bracteis floralibus ad 8 mm. longis lanceolatis tenuiter membranaceis, pedicellis cum ovario ad 1.5 cm. longis glabris. Flores saturate aurantiaco-flavi. Sepalum dorsale circ. 8 mm. longum, basi fere 4 mm. latum, ovatum, obtusiusculum, 5-nervium, eciliolatum, glabrum; sepala lateralia circ. 2.2 cm. longa, basi 4 mm. lata, anguste lanceolata, acuminata, cohaerentia, marginibus involutis haud planis. Petala circ. 3 mm. longa, ovata, sub-obtusa, margine minute erosula (vel si vis minute ciliolata). Labellum circ. 4 mm. longum linguiforme glabrum. Columna brevis alis acutis.

"West China :—Shweli Valley, Yunnan, on trees and rocks. Lat. 24° 50′ N. Alt. 5–6,000 ft. Epiphytic plant of 6–9 inches. Flowers in heads of 6–15, dull orange, non-fragrant. June 1912." G. Forrest. No. 8130.

"Shweli Valley. Lat. 25° 30′ N. Flowers deep orange-yellow, veined a deeper shade. August 1913." G. Forrest. Nos. 11,901, 17,970.

"Upper Burma :—Hpimaw; 5 7,000 ft. Epiphytic on alder and oak trees in open park land. Flowers orange. June 1914." F. Kingdon Ward. No. 1554.

The species is a very close ally of *C. cornutum*, Lindl.

Cirrhopetalum aurantiacum, W. W Sm. Sp. nov.

Species ex affinitate *B. gamosepali*, Griff. et *C. Roxburghii*, Lindl. a quibus pseudobulbis minimis, foliis parvis, sepalis petalisque glandulosis facile distinguitur; *C. sikkimense*, King et Pantling valde affine scapis brevibus multifloris inter alia differt.

Planta pusilla rhizomate repente gracili. Pseudobulbi 4–7 mm. longi, 3–4 mm. lati, ovoidei vel subcylindrici, inter se circ. 3–4 mm. distantes monophylli. Folia 1–2 cm. longa, 5–10 mm. lata, plus minusve elliptica, utrinque rotundata, petiolo 1 mm. longo suffulta, in sicco coriacea. Scapus 4–7 cm. altus, nunc fructifer

ad 13 cm. attingens, flexuosus gracillimus, bracteis vaginiformibus 1–2 munitus; umbella 3–4-flora, pedicellis circ. 5 mm. longis gracilimis, bracteis circ. 4 lanceolatis 2 mm. longis acutis membranaceis. Flores aurantiaci. Sepalum dorsale cymbiforme circ. 3 mm. longum trinervium, apice in cilium (ipsum 3 mm. longum productum, glandulis sessilibus pellucidis bene conspersum, marginibus cilioque longiuscule ciliolatis; sepala lateralia linearia ad 3 cm. longa, 2 mm. lata. Petala sepalo dorsali subaequilonga atque similiter ciliolata et glandulosa, trinervia. Labellum circ. 2 mm. longum linguiforme curvatum pedi brevi affixum glabrum. Columna 1 mm. alta alis acuminatis. Anthera bilocularis; pollinia non visa. Fructus fere 1 cm. longus.

"West China :—Szemao, Yunnan, on the west mountains at 6,000 ft. Epiphytic on tree. Flowers orange." A. Henry. No. 13,087.

The very small bulbs and leaves, the fringed petals and dorsal sepal, and the pellucid glands on the sepals and petals well distinguish this species.

Cirrhopetalum Farreri, W. W. Sm. Sp. nov.

Species ex affinitate *C. Wallichii*, Lindl. atque ejus sociorum; sepalis lateralibus (atque sepalo dorsali basi tantum) capillis longe papilliformibus dense indutis bene notata.

Pseudobulbi 1–2 cm. inter se distantes, anguste ovoidei, ad 2.5 cm. longi, unifoliati. Folia circ. ad 5 mm. petiolatim angustata, in spec. nostris vivis ad 7.5 cm. longa, ad 2 cm. lata, oblonga, apice rotundata et bifidula, coriacea. Scapus e basi pseudobulbi ortus, ascendens circ. 9 cm. altus, gracilis, flexuosus, bracteis inanibus tribus circ. 1 cm. longis lanceolatis aequidistantibus subappressis praeditus. Inflorescentia umbelliformis circ. 6-flora bracteis ovaria pedicellata paulo superantibus. Sepala lateralia circ. 3.5 cm. longa, ad basim circ. 3 mm. lata, lineari-lanceolata, longe acuminata, 5-nervia, nervis erga basin purpureis valde distinctis, integra, sordide brunnea, basi purpurascentia, cohaerentia, capillis longe papilliformibus a basi supra medium dense obsita; sepalum dorsale 6 mm. longum, basi 3 mm. latum, anguste ovatum, obtusum, in parte inferiore papillis induta, nervis tribus purpureis pererrata, marginibus purpurascentibus. Petala 4 mm. longa, 3 mm. lata, ovata, obtusa, ut sepala nervata atque colorata. Labellum sepalo dorsali brevius, ad pedem columnae circ. 2 mm. longum affixum; pars mobilis circ. 3.5 mm. longa, linguiformis, in modum leonis unguis curvata, carnosula, marginibus erectis, copiose purpureomaculata. Columna crassa 1 mm. paulo superans purpurea, dentibus apicalibus erectis. Ovarium cum pedicello 6-7 mm. longum viride obscure purpureo-maculatum.

Upper Burma. Cultivated in Royal Botanic Garden, Edinburgh, from plants collected by the late Mr Reginald Farrer. The stout papilliform hairs on the lateral sepals are very characteristic. It flowered Oct. 1920.

The following is conspecific but has much smaller pseudobulbs and leaves and rather smaller flowers than the cultivated specimen :—

"Upper Burma :—Htawgaw, valley of Naung-Chaung, Lashi country. Epiphytic orchid, in open park land, in shady places, at 5,000 ft. Flowers brick-red. May 1914." F. Kingdon Ward. No. 1560.

Cirrhopetalum oreogenes, W. W. Sm. Sp. nov.

Species ex affinitate *C. Wallichii*, Lindl. a quo scapo foliis multo longiore, floribus flavis inter alia divergit; ex descriptione cum *C. retusiusculo*, Hemsl. specie ex Yunnan et Burma collecta non quadrat, (sepalo dorsali haud retuso sepalis lateralibus longioribus).

Pseudobulbi 1.5–2.5 cm. inter se distantes, 1.5–2.5 cm. longi, ovoidei, monophylli. Folia petiolo circ. 5 mm. longo suffulta, 5–8 cm. longa, circ. 1.5 cm. lata, oblonga, apice rotundata nunc obscure retusa, coriacea. Scapus gracillimus circ. 12 cm. longus, vulgo folia duplo superans bracteis vaginiformibus 2–3 remotis munitus; bracteae florales lineari-lanceolatae acuminatae 5–7 mm. longae tenuiter membranaceae; pedicelli cum ovario bracteas paulo superantes. Flores plerumque circ. 5 saturate aurantiaco-flavi inter majusculos. Sepala lateralia circ. 4 cm. longa, medio circ. 6 mm. lata, lineari-lanceolata, acuta, trinervia, integra, flava, primum cohaerentia, basi apiceque exceptis; sepalum dorsale 6 mm. longum, 3 mm. latum, oblongum, apice rotundatum, trinerve. Petala 5 mm. longa, 2.5 mm. lata, subobovata, apice obtusa. Labellum sepalo dorsali multo brevius, ad pedem columnae processu incurvo 1 mm. longo affixum; pars mobilis 3 mm. longa, linguiformis, curvata, integra, carnosula, obtusa, jugis duobus lateralibus percursa, supra paulo furfuracea. Columna crassa 1 mm. paulo superans alis angustissimis, dentibus apicalibus duobus erectis. Anthera bilocularis polliniis ovalibus (majoribus duobus visis). Ovarium cum pedicello 8–9 mm. longum.

"Western China :—On the Tong Shan in the Yangtze bend, Yunnan, on trees in forests. Lat. 27° 20′ N. Alt. 7–8,000 ft. Epiphytic plant of 6–9 inches. Flowers deep orange-yellow. Sept. 1913." G. Forrest. No. 11,468.

"Hills to the north-east of Tengyueh, Yunnan, on trees and rocks. Lat. 25° 15′ N. Alt. 7,000 ft. Epiphytic plant of 6–9 inches. Oct. 1912." G. Forrest. No. 9285.

"Shweli-Salween divide, Yunnan. Epiphytic on trees and rocks. Lat. 25° 40′ N. Alt. 6–7,000 ft. Plant of 4–6 inches. Flowers orange-yellow. Aug. 1919." G. Forrest. No. 18,449.

Coelogyne flaccida, Lindl.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 6–12 inches. Sepals dull greenish-yellow, flushed on exterior pale rose. Petals same only lighter. Labellum yellowish, veined crimson-lake, margined same at apex. Faintly fragrant. May 1912." G. Forrest. No. 7801. Also sepals and petals ivory white. March 1913. G. Forrest. No. 9784.

New to China.

Coelogyne graminifolia, Reichb. f.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 6–15 inches. Sepals and petals waxy-white, labellum and rostellum brown, tinged crimson; fragrant. Jan. 1913." G. Forrest. No. 9510.

"Shweli Valley, Yunnan, on rocks and cliffs. Lat. 25° N. Alt. 6,000 ft. Epiphytic plant of 12–18 inches. In fruit. July 1912." G. Forrest. No. 8649.

New to China.

Coelogyne leucantha, W. W. Sm. Sp. nov.

Species gregis *Imbricatarum*; ob flores omnes, ut videtur, eodem anno apertos ad sectionem Elatas spectat; in sectione illa *C. pulchellae*, Rolfe proxima sed pseudobulbis parvis approximatis, foliis longiuscule petiolatis, labello haud obcordato recedit; si forte apud *Proliferas* ponenda, affinis *C. proliferae*, Lindl. et *C. flavidae*, Lindl. a quibus pseudobulbis parvis, petiolis pseudobulbum longe superantibus, racemo densifloro, floribus albis, carinis tribus distinguitur.

Pseudobulbi 1.5–2 cm. longi, ad 1 cm. lati, ovato-oblongi, in rhizomate sat crasso arcte approximati diphylli. Folia ad 4 cm. petiolata, circ. 12 cm. longa, 2 cm. lata, anguste oblongo-lanceolata, acuta atque apiculata, tenuiter coriacea. Scapus 10–20 cm. altus, gracilis multiflorus, infra flores glumis imbricatis dense indutus; bracteae cito deciduae non visae. Flores eodem anno omnes evoluti, ut ex spec. nostris videtur, albi, magnitudine eos *C. pulchellae* aequantes. Sepala 13–14 mm. longa, suboblonga, acuta. Petala aequilonga acuta. Labellum aequilongum trilobum; lobi laterales dimidium labelli aequantes antice rotundati; lobus intermedius fere orbicularis nec obcordatus

nec bilobus, margine undulato-crenulatus; carinae tres a basi labelli ad duas partes lobi intermedii pertinentes. Gynostemium 1.1 cm. longum.

"Upper Burma :—Hpimaw village, growing on rocks on grassy hillsides on granite substratum. Alt. 8,000 ft. Flowers white. June 1914." F. Kingdon Ward. No. 1669.

A near ally of *C. pulchella*, Rolfe of which the native country is unknown.

Coelogyne longipes, Lindl.

"West China :—Shweli Valley, Yunnan. Epiphytic on rocks. Lat. 25° N. Alt. 6,000 ft. Plant of 20 inches. Flowers dull yellow, striped and marked brown. May 1912." G. Forrest. No. 7986.

"Flank of volcanic mountain north-west of Tengyueh, Yunnan, on rocks. Lat. 25° 10′ N. Alt. 7,000 ft. Epiphytic plant of 12–18 inches. Sepals and petals dull white, flushed rose on exterior. Labellum yellowish-brown with a white margin. June 1912." G. Forrest. No. 8109.

"Upper Burma :—Valley of the Nanaung-hka. Alt. 4–5,000 ft. Epiphytic orchid, growing on big trees in patches of jungle. Flowers dense brownish-yellow, racemes more or less pendant. June 1919." F. Kingdon Ward. No. 3209.

Not recorded from China and apparently not from Burma.

Coelogyne ovalis, Lindl.

"West China :—Hills to the north-east of Tengyueh, Yunnan, on trees in open situations. Lat. 25° N. Alt. 6–7,000 ft. Epiphytic plant of 6–8 inches. Sepals and petals dull yellow. Rostellum dull yellow, faintly marked lake. Labellum fringed, ground colour dull yellow, heavily veined lake crimson merging towards centre into a double blotch; non-fragrant. July 1912." G. Forrest. No. 8668. July 1917. G. Forrest. No. 16,035.

"S.E. Tibet :—Salween Valley, province of Tsarong; Salween-Kiuchiang divide, in shady situations on trees and humus-covered rocks. Lat. 28° 40′ N. Long. 98° 20′ E. Creeping epiphytic plant of 5–7 inches. Flowers creamy-yellow, labellum heavily lined and marked deep blood crimson. July 1919." G. Forrest. No. 19,030.

Apparently unrecorded for China and Tibet.

Coelogyne prolifera, Lindl.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 12–18 inches. Sepals and petals dull yellow, flushed rose. Labellum

white at base, yellowish towards apex with brownish-yellow markings; fragrant. June 1912." G. Forrest. No. 8613.

New to China.

Coelogyne Sanderae, Kränzl.

"West China :—Lava bed west of Tengyueh, Yunnan, epiphytic on rocks. Lat. 25° N. Alt. 5,000 ft. Plant of 12–18 inches. Flowers fleshy, sweetly fragrant. Sepals dull ivory-white; petals same. Labellum dull white exterior, interior having two parallel lines of golden-brown hair on lower surface with base flushed golden brown; apex bright yellow. Rostellum white. May 1912." G. Forrest. No. 7935.

New to China. The species has typically three fimbriate carinae, not two as in the Yunnan specimen of Forrest.

Cremastra Wallichiana, Lindl.

Kweichow :—At Pai Tchen. Very rare. May 1908. J. Cavalerie. No. 3361 in Herb. Lévl.

Occurs in the East Himalaya and in Japan; apparently unrecorded previously from China.

Dendrobium candidum, Wall.

"West China :—N.W. Yunnan. 4,000 ft. On dry rocks. April 1913." F. Kingdon Ward. No. 214.

"N'Maikha-Salween divide, Yunnan, on trees in mixed forest. Lat. 26° 10′ N. Alt. 7,000 ft. Epiphytic plant of 9–14 inches. Flowers white, flushed pale purplish-rose exterior; labellum yellow. May 1919." G. Forrest. No. 17,960.

"Upper Burma :—Hpimaw; 6,000 ft. Flowers white, scarcely scented. On granite rocks at foot of Hpimaw Hill. April 1919." R. Farrer. No. 853.

An extension eastwards into China and Upper Burma.

Dendrobium Hookerianum, Lindl.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 18–30 inches. Sepals and petals bright orange. Labellum orange at base, yellow towards apex, margins heavily fringed, heavily marked crimson-lake from centre down sides to base. Rostellum light yellow with two blotches on inner base of crimson-lake; non-fragrant. June 1912." G. Forrest. No. 8542.

New to China.

Dendrobium porphyrochilum, Lindl. var.

"West China :—N'Maikha-Salween divide, Yunnan, on trees

and rocks in side valleys. Lat. 26° 25′ N. Alt. 7,000 ft. Epiphytic plant of 2–4 inches. Flowers yellow. August 1919." G. Forrest. No 18,374.

Possibly a variety of this Himalayan and Khasian species, agreeing very closely in structure but differing somewhat in the yellow colour of the flowers. In the dried state the labellum has a faint purplish tinge.

Dendrobium scoriarum, W. W. Sm. Sp. nov.

Species ex affinitate *D. yunnanensis,* Finet a quo foliis oblongis, floribus longius pedicellatis, sepalis petalisque acutiusculis, labello ad medium calloso, antherae apice longe producto divergit.

Planta epiphytica ad 60 cm. alta. Caules caespitosi, plus minusve erecti, sinuosi, gracillimi, 2–3 mm. crassi, foliosi, sub anthesi defoliati. Folia disticha, plerumque 4–4.5 cm. longa, 1–1.5 cm. lata, oblonga, apice obtusa paulo asymmetrica, coriacea, vaginis persistentibus caulem tegentibus. Flores cito in sicco decidui, ut videtur 1–2-nati, basi vaginulis paucis praediti, pedicellis cum ovario circ. 2.5 cm. longis. Sepala lateralia falcato-ovata, circ. 1.6 cm. longa, basi fere 1.3 cm. lata, acutiuscula, 5-nervia; dorsale ovato-lanceolatum, circ. 1.5 mm. longum acutatum 5-nervium. Petala circ. 1.4 cm. longa, medio 6 mm. lata, lanceolata, acutiuscula textura tenuissima glabra. Labellum columnae pedi adnatum trilobum, circ. 1.2 cm. longum, medio ad 9 mm. latum; lobi laterales rotundati circ. 4 mm. diametro sub lente minute serratuli et intus minute pubescentes; intermedius paulo longior circ. 6 mm. latus ovatus apice acutus intus puberulus, margine minute serratulus; discus circ. 4 mm. longus, antice ad basin lobi intermedii callositate sphaerica praeditus; pes circ. 1.2 cm. longus ad insertionem labelli jugis carnosis munitus, ad columnam supra papilloso-scabriduLus. Columna brevis dentibus anticis obsoletis. Anthera bilocularis processu bifido 3 mm. longo roseo coronata. Quoad floris colorem confer infra.

"West China :—West of Tengyueh, Yunnan, on rocks and trees on the outskirts of lava bed. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 2 ft. Sepals yellowish with a flush of red; petals pale yellowish-white. Labellum, base crimson-lake, centre pale-yellow, apex crimson-lake. Rostellum, base yellowish, tip brilliant rose-magenta; odourless. June 1912." G. Forrest. No. 8517.

Dendrobium stuposum, Lindl.

"West China :—Flank of volcanic mountain north-west of Tengyueh, Yunnan, on rocks. Lat. 25° 10′ N. Alt. 7,000 ft.

Epiphytic plant of 12–20 inches. Flowers pale yellow, base of spur tinged dull rose. June 1912." G. Forrest. No. 8414.

New to China.

Dendrobium tapingense, W. W. Sm. Sp. nov.

Species ex affinitate *D. hymenopteri*, Hook. f. a quo labello oblongo-cuneato inter alia recedit.

Caules fasciculati 20–45 cm. alti, pauciramosi, graciles, pluriarticulati internodiis sulcatis 2–3 cm. longis, primo vaginis membranaceis albidis obsiti tandem nudi nitidi. Folia sub anthesin decidua. Flores solitarii ad apicem ramulorum pauciarticulatorum orientes, inter minores, flavi, roseo-tincti, fragrantes. Sepalum dorsale oblongum 4 mm. longum apice rotundatum; sepala lateralia ovata obtusa latere posteriore 4 mm. longa, antice in mentum saccatum 5 mm. longum cum pede gynostemii ejusque lateribus omnino conjuncta. Petala fere 4 mm. longa, oblanceolata, apice subtruncata. Labellum circ. 1 cm. longum, ad pedem gynostemii affixum, oblongo-cuneatum vel subspathulatum, incurvum, basi angustius et bicallosum, apice 3 mm. latum subtruncatum, medio marginibus paulo crenulatis. Columna brevissima; filamentum subulatum longiusculum; pollinia 4. Ovarium cum pedicello 1.6–1.7 cm. longum gracile. Capsula anguste obovoidea ad 4.5 cm. longa.

"Upper Burma :—Bank of the Taping. Lat. 24° 25′ N. Alt. 2,000 ft. Epiphytic plant of 9–18 inches. Flowers dull creamy-yellow, flushed rose, fragrant. On trees in shady jungle. March 1914." G. Forrest. No. 12,608.

Dendrobium thyrsiflorum, Reichb. f.

Forma parviflora ex R. A. Rolfe in scheda.

"West China :—Shweli Valley, Yunnan, on trees. Lat. 25° 30′ N. Alt. 5,000 ft. Epiphytic plant of 9–12 inches. Petals and sepals white, labellum bright orange. May 1919." G. Forrest. No. 18,051.

Not previously recorded from China.

Dendrobium Wardianum, Warner.

"West China :—Hills to the east of Tengyueh, Yunnan, epiphytic on rocks and cliffs. Lat. 25° N. Alt. 6,000 ft. Plant of 1–2½ ft. Flowers fleshy, fragrant. Sepals pure white flushed magenta-rose towards apex. Petals white with a blotch of bright magenta-rose towards apex. Rostellum yellowish, rose towards base. Labellum deep orange, veined purplish-lake and with two blotches of the same colour, one on each side

towards base. Apex broadly margined, light lemon-yellow. May 1912." G. Forrest. No. 7771.

New to China.

Eria bambusifolia, Lindl.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks in open situations. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 2½–4 ft. Flowers dull yellowish-white, striped purple-maroon. December 1912." G. Forrest. No. 9349.

New to China.

Eria stevia, W. W. Sm. in Notes Roy. Bot. Gard. viii (1915), 335.

This plant was described from a plant in cultivation. Since the publication dried specimens have come to hand. These agree with the cultivated plant. The localities in Yunnan for this species can now be given more accurately.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,600 ft. Epiphytic tufted plant of 12–18 inches. Sepals and petals ivory white. Rostellum, base white, apex pale orange, side margins pale rose; faintly fragrant. July 1912." G. Forrest. Nos. 8753, 9089.

"Shweli-Salween divide, Yunnan, on rocks in open situations. Lat. 25° 30′ N. Alt. 9,000 ft. Matted plant of 10–16 inches. Flowers maroon and white, fragrant. July 1913." G. Forrest. No. 11,762. Also August 1910. G. Forrest. No. 18,441.

Eriodes barbata, Rolfe.

Tainia barbata, Lindl.; *Eria barbata*, Reichb. f.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,000 ft. Plant of 2–2½ ft. Flowers yellow, netted and marked crimson-maroon, fragrant. November 1912." G. Forrest. No. 9303. September 1917. G. Forrest. No. 15,989.

An extension into China of the Khasian species.

Eulophia monantha, W. W. Sm. Sp. nov.

Species ex affinitate *E. bracteosae*, Lindl. et *E. herbaceae*, Lindl. a quibus foliis linearibus, inflorescentiis subunifloris, sepalis angustis longe distat.

Planta ex collectore 15–22 cm. alta. Tuber crassum oblongum. Folia in speciminibus nostris ad 18 cm. longa, 4–5 mm. lata, linearia, acuminata, plicata, textura firma, glabra; ad basin caulis folia 2–3 reducta squamiformia. Scapus folia subaequans gracilis rigidus glaber bracteis 2–3 remotis lanceolatis

acutis membranaceis praeditus. Flos in spec. nostris solitarius bracteis inferioribus sterilibus majusculus viridis fragrans. Sepala circ. 3 cm. longa, 5 mm. lata, anguste oblanceolata, obtusa. Petala 2 cm. longa, 6 mm. lata, oblonga, obtusa. Labellum 2.3 cm. longum, fere 1 cm. latum, lobis lateralibus angustissimis, intermedio obscure undulato-trilobulato lineis furfuraceis circ. 7 pererrato; calcar 5 mm. longum. Columna 9 mm. alta polliniis typicis duobus; pes nulla.

"West China :—Tali Range, Yunnan, in open dry situations amongst rocks in pine forests. Lat. 25° 40′ N. Alt. 9,000 ft. Plant of 6–9 inches. Flowers olive-green with brown markings, fragrant. August 1913." G. Forrest. No. 11,725.

A very distinct species in its narrow leaves and solitary flowers.

26106 **Galeola shweliensis**, W. W. Sm. Sp. nov.

Species affinis *G. Lindleyanae*, Reichb. f. a qua inflorescentiis valde ramosis, sepalis petalisque angustis oblongis haud ovatis praeter alia signa removitur.

Rhizoma circ. 2 cm. crassum squamis triangulari-ovatis carnosis praeditum. Caules 1 m. alti vel paulo altiores, simplex nisi in regione florali, vaginis triangularibus 2–3 cm. longis muniti, fulvido-furfuracei, glabrescentes. Paniculae amplae ramis elongatis ascendentibus multifloris; bracteae 5–10 mm. longae ovato-lanceolatae acutae. Sepala subaequalia 2.5 cm. longa, 5 mm. lata, lineari-oblonga, obtusa. Petala sepalis subsimilia. Labellum cymbiforme circ. 2 cm. longum, 8 mm. altum, marginibus erosulis, lamellis numerosis crenulatis percursum. Columna 1 cm. longa. Capsula vix matura 16 cm. longa, 2 cm. lata, oblonga, paululo falcato-curvata, obtuse apiculata.

"West China :—Shweli-Salween divide, Yunnan, amongst heavy grass on the margins of thickets and among rocks. Lat. 25° 45′ N. Alt. 7–8,000 ft. Plant of 3–4 ft. Flowers fleshy; outer segments of perianth dull creamy-yellow, flushed crimson, interior segment dull crimson. July 1919." G. Forrest. No. 18,166.

"Duplicate of No. 18,166 in fruit. Fruits crimson, fleshy. September 1919." G. Forrest. No. 18,596.

26107 **Habenaria chrysea**, W. W. Sm. Sp. nov.

Species inter Habenarias cum *H. camptocerate*, Rolfe, comparanda a qua signis multis longe recedit.

Planta ad 10 cm. alta tubere parvo subgloboso praedita. Caulis basi squamis 1–2 longiusculis circumdatus. Folia sub-

basalia duo fere opposita in partem brevem vaginantem angustata; lamina 3.5–4 cm. longa, 8–10 mm. lata, oblonga vel oblongo-lanceolata apice angustata breviter apiculata. Bractea maxima circ. 4.5 cm. longa oblanceolata apiculata involuta; in axilla bracteae oritur flos solitarius caulem terminans. Flos laete flavus longe stipitatus, ovario circ. 1 cm. longo, stipite erecto valido ad 2.5 cm. longo, calcare circ. 2.5 cm. longo cylindrico fere recto stipiti subparallelo atque approximato; sub anthesi floris stipes atque calcar in bractea involuta fere omnino abscondita. Sepala dissimilia; dorsale oblongum circ. 1 cm. longum 4 mm. latum supra angustatum apice ipso apiculata; lateralia falcata, 1.4 cm. longa, basi ovata ibique 3 mm. lata, supra sensim in apicem acuminatum angustata, erecta post dorsale retro projecta. Petala late ovata circ. 1.2 cm. longa, 7 mm. lata, apice obtusa, basi obliqua, uno latere ascendente, altero latere auriculatim extenso. Labellum deltoideum, 1.2 cm. longum, basi 1.2 cm. latum, subintegrum marginibus paulo undulatis, per costulam mediam incrassatum, basi ad os calcaris sulco parvo mediano praeditum. Gynostemium circ. 4 mm. altum, antherae locellis magnis parallelis approximatis infeliciter in spec. nostro vacuis, canalibus brevibus, polliniis non visis, staminodiis parvis ovatis, processubus stigmaticis ut videtur nullis, stigmate sub rostello et supra os calcaris posito.

"S.E. Tibet :—On Doker-la, Mekong-Salween divide, Tsarong province, in open alpine pasture. Lat. 28° 20′ N. Alt. 12–13,000 ft. Plant of 3–5 inches. Flowers bright yellow, spur a shade darker. August 1917." G. Forrest. No. 14,738.

The material of this very interesting plant is unfortunately very scanty and I have not succeeded in making a satisfactory analysis of the structure of the gynostemium. The pollinia were absent from the flower examined. The whole structure and appearance of the flower recalls *H. camptoceras*, Rolfe in a general way but it is not closely akin to that species. Mr Forrest on this present expedition may be able to supplement the material.

Habenaria constricta, Hook. f.

Peristylus constrictus, Lindl.

"West China :—Szemao, N.W. grass mountains at 5,000 ft.; white flowers." A. Henry. No. 13,126.

"Divide between the Shweli and Tengyueh valleys, Yunnan, in open situations on the margins of scrub. Lat. 25° 10′ N. Alt. 6–7,000 ft. Plant of 20–28 inches. Flowers white non-fragrant. July 1912." G. Forrest. No. 8625.

Not previously recorded from China.

Habenaria corticicola, W. W. Sm. Sp. nov.

Species valde affinis *H. furciferae*, Lindl. a qua floribus plus duplo majoribus, calcare ad 3 cm. longo, labelli lobis lateralibus recto angulo abeuntibus inter alia divergit.

Planta ad 20 cm. alta. Caulis basi squamis paucis indutus, infra foliis approximatis bene munitus supra bracteatus. Folia ad basim vaginantem breviter angustata, plerumque 7–11 cm. longa, ad 2.5 cm. lata, plus minusve oblonga vel nunc anguste oblanceolata, apice acuta vel breviter acutata; bracteae 2–3, ad 2.5 cm. longae, supra decrescentes, lanceolatae, acuminatae. Racemus 6–8 cm. longus, laxe 4–8-florus; bracteae florales ad 1.5 cm. longae, lanceolatae, ovario stipitato multo breviores. Sepala lateralia ovato-lanceolata, circ. 6 mm. longa, paulo falcata, deflexa, obtusa, trinervia; dorsale 6 mm. longum, ovatum, cucullatum, obtusum, trinervium. Petala sepalis aequilonga lineari-oblonga, basi latiuscula, obtusa uninervia. Labellum sepalis multo longius tripartitum; lobi laterales 1.5–2 cm. longi recto angulo abeuntes filiformes intermedio simillimo haud latiore paulo longiores; calcar ad 3 cm. longum ovario stipitato duplo longius gracillimum paululo curvatum. Anthera canalibus divergentibus 1 mm. longis, polliniis 1 mm. paulo superantibus ovoideis, caudiculis gracillimis 2 mm. longis, glandulis parvis, rostello triangulari infra utrinque producto, staminodiis parvis subovatis. Processus stigmatici circ. 2 mm. longi anguste cylindrici.

"Upper Burma :—Mang-kyi. Alt. 4,000 ft. Flowers pale greenish-yellow. Epiphytic on alder trees, rooted in the crevices of the bark. September 1919." F. Kingdon Ward. No. 3538.

Habenaria diceras, Schltr.

"Upper Burma :—Hpimaw hill; 8,200 ft. In coppice on the northward slope of the limestone col. September 1919." F. Kingdon Ward. No. 1307.

New to Burma.

Habenaria (Platanthera) glossophora, W. W. Sm. Sp. nov.

Species affinis *P. Henryi*, Rolfe atque *P interruptae*, Maxim.; foliis lineari-lanceolatis acuminatis, petalis ita late ovatis ut orbicularia videantur, labello basi angustata spathulato-dilatato inter alia notata.

Planta gracilis ad 60 cm. alta tuberidiis anguste cylindricis. Caulis basi squamis paucis brevibus munitus. Folia circ. 5 aequaliter distributa deinde sensim in bracteas abeuntia, infra in partem tubulosam vaginantem ad 4.5 cm. longam angustata: lamina ad 16 cm. longa, vulgo 1–1.5 cm. lata, lineari-lanceolata,

longe acuminata; bracteae 4–5, ad 4 cm. longae lineares valde acuminatae. Spica ad 19 cm. longa, 2 cm. lata, multiflora, subdensiflora, floribus regulariter dispositis viridibus fragrantibus, bracteis floralibus ad 1.8 cm. longis linearibus acuminatis supra sensim decrescentibus. Sepala inaequalia; dorsale 4 mm. longum, ovatum obtusum, cucullatum; lateralia 6 mm. longa, deflexa, ovato-oblonga, subfalcata, obtusa. Petala sepalo dorsali aequilonga late ovata, fere suborbicularia apice obtusissima. Labellum sepalis lateralibus aequilongum linguiforme a basi angustata paululo spathulato-dilatatum integerrimum; calcar ovario dimidium longius gracile bene curvatum. Pollinia ovoidea caudiculo aequilongo atque glandula lineari-oblonga munita; staminodia ovata parva; stigma in fovea processubus nullis.

"West China:—Hills to the north-west of Tengyueh, Yunnan, amongst grass on the margins of thickets. Lat. 25° 10′ N. Alt. 6–7,000 ft. Plant of 1½–2 ft. Flowers white and green, fragrant. June 1912." G. Forrest. No. 8148.

2410 Habenaria (Platanthera) multibracteata, W. W. Sm. Sp. nov.

Species ex affinitate *Platantherae Henryi*, Rolfe a qua habitu foliosiore, bracteis inanibus numerosis nunc ad 14, spica densiflora, bracteis floralibus flores vulgo semi-aequantibus, sepalo dorsali obtusissimo, petalis haud acutis recedit.

Planta ad 60 cm. alta habitu *P. Henryi*. tuberidiis anguste cylindricis. Caulis basi squamis paucis brevibus circumdatus. Folia vulgo 3–4, fere sessilia, parte vaginante brevissima, in spec. nostris 5–6 cm. longa, 2–3 cm. lata, late vel nunc anguste elliptica, apice obtusissima vel breviter obtuse angustata; bracteae numerosae nunc ad 14, anguste oblongo-lanceolatae, ad 4 cm. longae, supra gradatim decrescentes. Spica 15–20 cm. longa multiflora subdensiflora, bracteis floralibus 7–15 mm. longis flores plerumque semi-aequantibus lanceolatis vel ovato-lanceolatis subacuminatis. Sepala paulo inaequalia; dorsale late ovatum vel subellipticum, 5 mm. longum, 3–5 mm. latum, obtusissimum; lateralia deflexa circ. 6 mm. longa, oblique oblonga obtusa. Petala 5 mm. longa, oblique ovata obtusa. Labellum 7 mm. longum ligulatum integrum, calcari gracili curvato quam ovarium parte tertia longiore. Pollinia ovoidea caudiculo aequilongo atque glandula suborbiculari praedita; staminodia parva; anthera medium petalorum superans latiuscula loculis sejunctis; fovea stigmatica supra os calcaris posita.

"West China:—Hills to the north-east of Tengyueh, Yunnan, in rocky pasture. Lat. 25° N. Alt. 6–7,000 ft. Plant of 18–24 inches. Flowers green. June 1912." G. Forrest. No. 8402.

Habenaria ophiocephala, W. W. Sm. Sp. nov.

Species quoad habitum ex affinitate *H. pectinatae,* Don sociisque ejus sed floribus 1–2, labello integro lineari-lanceolato praelongo, calcare ad 7 cm. longo praeter alia signa bene notata; a speciebus cognitis sectionis *Hologlossae,* Hook. f. longe recedit.

Planta 25–30 cm. alta tuberidiis magnis cylindricis crassissimis. Caulis basi squamis longis 2–3 circumdatus. Folia vulgo tria basi breviter vaginatim angustata; lamina 10–15 cm. longa, 2–4 cm. lata, oblonga vel oblongo-lanceolata, apice plus minusve acuta. Inflorescentiae vulgo biflorae, bracteis ad 4.5 cm. longis ovato-lanceolatis acutis, floribus magnis albis, calcare sepalisque lateralibus pallide viridibus exceptis. Sepala inaequalia; dorsale late ovatum, 2 cm. longum, 1.6 cm. latum, apice obtusa acutatum; lateralia deflexa ovato-lanceolata valde falcata, 2.7 cm. longa, ad basim 8 mm. lata, acuminata. Petala sepalis lateralibus subsimilia sed 2 cm. vix superantia. Labellum fere 4 cm. longum, integrum, anguste lineari-lanceolatum, basi circ. 6 mm. latum; calcar ad 7 cm. longum cylindricum vix curvatum apice paulo dilatatum. Gynostemium magnum circ. 1.2 cm altum, vix expansum fere 2 cm. latum, subquadratum; pollinia ovoidea circ. 4 mm. longa, caudiculo circ. 8 mm. longo, glandlua magna orbiculari; antherae locelli distantes; rostellum late triangulare; structuram stigmatis e materie haud bene siccata non intellego. Ovarium ad 3.5 cm. longum.

"Upper Burma :—Laktang, at 7,000 ft. Epiphyte (?) growing low down and therefore well shaded in the temperate rainforest. Flowers white, except spur and lower petals (sepals?) which are pale green. A remarkable plant. The two stamens are widely separated by the large stigmatic area at the base of which is the entrance to the long sack-like spur. Honey is secreted at the base of the spur in large quantities. The spur is so long that no insects save butterflies and moths could get at the honey unless they went into the tube. One tube was bitten through at the base, another had a quarter of an inch of honey in it. Not common. Plants always solitary. July 1919." F. Kingdon Ward. No. 3336.

The species recalls *H. pectinata,* D. Don and *H. Susannae,* R. Br. but it has a long simple labellum. It is very different from anything in section *Hologlossae* of Hooker. Its affinities in spite of the form of the lip seem to be with the species mentioned above. In the dried state the outline of the flower resembles the bluntly triangular flattened head of a viper.

Habenaria (Platanthera) oreophila, W. W. Sm. Sp. nov.

Species ex affinitate *P. interruptae,* Maxim. et *P. japonicae,*

Lindl. a quibus inflorescentiis densis, floribus minoribus, petalis diversis inter alia recedit.

Planta ad 35 cm. alta robusta tuberidiis cylindricis crassissimis. Caulis basi squamis 1–2 longiusculis circumdatus. Folia circ. 4 distributa in partem tubulosam vaginantem longam angustata; lamina 8–9 cm. longa, ad 3 cm. lata, elliptica vel lanceolata, breviter acutata; bracteae 3–5 anguste lanceolatae, ad 4.5 cm. longae, acutae. Spica circ. 7.5 cm. longa multiflora densiflora, bracteis floralibus 1 2 cm. longis inferioribus flores superantibus lanceolatis acutiusculis, floribus viridibus. Sepala carnosula paulo inaequalia, dorsale 6 mm. longum late ovatum cucullatum obtusum, lateralia deflexa ovata fere 7 mm. longa, paulo acutata. Petala sepalo dorsali aequilonga triangulari-ovata paulo acutata margine minutissime puberula. Labellum circ. 7 mm. longum integrum lineare carnosum apice acutatum, calcare ad 1.3 cm. longo cylindrico latiusculo apice dilatato paululo curvato quam ovarium fere duplo longiore. Pollinia ovoidea caudiculo aequilongo atque glandula suborbiculari praedita; staminodia auriculaeformia parva; anthera ipsa latiuscula ad medium petalorum attingentia loculis parallelis sejunctis; processus stigmatici nulli; stigma sub rostello triangulari positum.

"West China :—Mountains in the N.E. of the Yangtze bend, Yunnan, in open stony pasture. Lat. 27° 45′ N. Alt. 10,000 ft. Plant of 14 inches. Flowers green. July 1913." G. Forrest. No. 10,631.

Habenaria (Platanthera) pugionifera, W. W. Sm. Sp. nov.

Species affinis *Habenariae Biermannianae*, King et Pantling labello simillimo praedita sed foliis ellipticis obtusis, calcare longo ovarium plus minusve aequante distinguitur.

Planta 40–50 cm. alta tuberidiis anguste cylindricis. Caulis basi squamis 2–3 longiusculis circumdatus. Folia 2–3, in partem vaginantem longam angustata; lamina 8–12 cm. longa, 2.5–4 cm. lata, elliptica, apice rotundata vel obtusa; bracteae 2–3 lineari-lanceolatae ad 4.5 cm. longae acutatae. Spica ad 11 cm. longa multiflora subdensiflora, bracteis floralibus circ. 1 cm. longis flores subaequantibus lineari-lanceolatis acutis. Sepala paulo inaequalia obtusa, dorsale ovatum 3 mm. longum, lateralia patentia oblonga circ. 4 mm. longa. Petala sepalo dorsali aequilonga anguste oblonga basi latiuscula obtusa. Labellum forma ei *H. Biermannianae* simillimum circ. 4 mm. longum lineari-oblongum basi utrinque denticulis triangularibus patentibus instructum, calcari 7–8 mm. longo ovarium aequante gracili paulo curvato. Pollinia ovoidea caudiculo subaequilongo atque glandula suborbiculari (nuda sed inter valvulas carnosulas posita) praedita; staminodia minima; anthera latiuscula loculis

parallelis sejunctis; fovea stigmatica sub rostello triangulari.

"West China :—At Atuntzu, N.W. Yunnan in forest sub-belt in damp shade. 12–13,000 ft. July 1913." F. Kingdon Ward. Nos. 920, 921.

Habenaria roseotincta, W. W. Sm. Sp. nov.

Species ex affinitate *H. oliganthae*, Hook. f. a qua floribus secundis albis, calcare brevi, inter alia differt; etiam *H. urceolatam*, Clarke (*Diphylacem urceolatam*, Hook. f.) in memoriam revocat sed staminodia singularia ejus speciei omnino desunt.

Planta 7–20 cm. alta gracilis tuberidiis anguste cylindricis. Caulis flexilis basi squamis 1–2 longiusculis praeditus. Folia nunc solitaria multo sub medio cauli orientia, nunc alterum multo minus supra medium additum lanceolatum acutum subbracteiforme; folium inferius in partem vaginantem longiusculam angustatum; lamina ad 6 cm. longa, ad 2.5 cm. lata, elliptica apice obtusa apiculata vel nunc acuta; bracteae inanes nullae nisi folium superius ita definitum. Spica circ. 5 cm. longa 5–12-flora, floribus approximatis albis roseo-tinctis, bracteis floralibus 6–12 mm. longis lanceolatis acutis inferioribus flores aequantibus vel nunc superantibus. Sepala subaequalia circ. 6 mm. longa, textura tenuia, dorsale lanceolatum acutum, lateralia deflexa lanceolata paululo falcata acuta. Petala 4 mm. paulo superantia, ovato-lanceolata, acuta. Labellum circ. 4·5 mm. longum, lanceolato-linguiforme integrum, sepalis textura firmius sed vix carnosum acutatum, calcare 3 mm. longo elongato-scrotiformi, ovario circ. 7 mm. longo. Anthera ad medium sepali dorsalis attingens loculis approximatis parallelis, poliniis anguste cylindricis, caudiculis brevibus, glandula minima, canalibus subnullis; staminodia parva ad latera antherae subovata; processus stigmatici breviter oblongi.

"S.E. Tibet :—On Doker-la, Mekong-Salween divide. Tsarong province, in open stony pasture by streams. Lat. 28° 20′ N. Alt. 12,000 ft. Plant of 3 9 inches. Flowers white, faintly flushed rose. August 1917." G. Forrest. No. 14,743.

"Upper Burma :—Chimili Ridge, at 12,500 ft. In the fine grass on the actual arête. Flowers white, fragrant. August 1919." R. Farrer. No. 1150.

Habenaria (Platanthera) subulifera, W. W. Sm. Sp. nov.

Species affinis *P. Henryi*, Rolfe et *P. interruptae*, Maxim. a quibus petalis quam sepalis multo angustioribus subuliformibus anthera latissima fere celatis inter alia recognoscitur.

Planta ad 40 cm. alta, habitu *P. Henryi*, tuberidiis anguste cylindricis. Caulis basi squamis 1–2 elongatis circumdatus. Folia plerumque duo subbasalia in partem tubulosam vaginan-

tem angustata; lamina 12–14 cm. longa, 3–3.5 cm. lata, anguste elliptica, apice rotundata vel obtusa; bracteae circ. 3 lineari-lanceolatae vel lineares acutae 2–4.5 cm. longae. Spica ad 10 cm. longa multiflora sublaxiflora bracteis floralibus ad 1.5 cm. longis lineari-lanceolatis acutis. Sepala inaequalia; dorsale 6–7 mm. longum, fere 6–7 mm. latum, perlate ovatum, obtusiusculum; lateralia circ. 9 mm. longa, ovata, apice breviter acutata, deflexa. Petala circ. 5.5 mm. longa subuliformia circ. 0.5 mm. lata, basi paulo latiora, inter sepalum dorsale atque antheram fere celata. Labellum ligulatum simplex circ. 1 cm. longum; calcar ovario circ. 1.3 cm. longo dimidium longius valde curvatum. Pollinia ovoidea caudiculo aequilongo atque glandula orbiculari munita; staminodia ovata parva; anthera latissima circ. 4 mm. lata subquadrata loculis bene sejunctis; rostellum triangulare obtusissimum; fovea stigmatica latiuscula.

"West China:—N.W. Yunnan, Mekong-Salween divide. In pine forests. Alt. 10,000 ft. July 1913." F. Kingdon Ward. No. 784.

Habenaria urceolata, Clarke.

Diphylax urceolata, Hook. f.

"S.E. Tibet:—N.W. Yunnan, Doker-la. Alt. 14,000 ft. Under Abies at tree limit. October 1913." F. Kingdon Ward. No. 1136.

"Upper Burma:—Hpimaw pass; 11,000 ft. In the highest alpine woodland in particularly damp cold Rhododendron glades, occasional among the deep moist mosses and Hymenophyllums that clothe their perpetually dripping trunks. Flowers pure white. September 1919." R. Farrer. No. 1314.

Not recorded from Tibet or Burma previously.

Herminium calceoliforme, W. W. Sm. Sp. nov.

Species ex affinitate *H. Duthiei*, Hook. f. et *H. orbicularis*, Hook. f. a quibus labello aurantiaco calceoliformi omnino inverto inter alia differt.

Planta 5–10 cm. alta gracilis tuberidiis tenuissime elongatis. Caulis basi squamis 1–2 circumdatus. Folia 2–3 in dimidio caulis inferiore distributa, ad 3 cm. longa, circ. 4 mm. lata, anguste lanceolata, acuta, longiuscule petiolatim angustata, basi tantum breviter vaginantia; bracteae ad medium caulis 1–2, circ. 5–10 mm. longae lineari-lanceolatae. Spica circ. 1.5 cm. longa, 6–9-flora, bracteis lanceolatis acutis ovarium vel nunc flores aequantibus. Sepala subaequalia textura tenuia late oblonga obtusa circ. 1.5 mm. longa. Petala ovata obtusa 1 mm. longa. Labellum sepalis aequilongum carnosulum calceoliforme in flore everto dorsale aurantiacum, calcare brevissime saccato. Gy-

nostemium brevissimum ad medium petalorum attingens ovatum locellis antherae angustis subparallelis, polliniis anguste cylindricis caudiculo breviore atque glandula minuta praeditis; staminodia parvula sed distincta. Ovarium cum pedicello brevi 3 mm. longum.

"West China :—Kari Pass, Mekong-Yangtze divide, Yunnan, in open stony pasture. Lat. 27° 40′ N. Alt. 10,000 ft. Plant of 2–4 inches. Flowers fragrant, tipped dull orange. August 1914." G. Forrest. No. 13,110.

Herpysma longicaulis, Lindl.

"West China :—Western flank of the Shweli-Salween divide, Yunnan, on humus-covered boulders in shady forests. Lat. 25° 20′ N. Alt. 7–8,000 ft. Plant of 12–18 inches. Flowers yellow. November 1912." G. Forrest. No. 9378.

Not previously recorded from China.

Ione scariosa, King et Pantling.

Sunipia scariosa, Lindl.

"West China :—Shweli Valley, Yunnan, on trees and rocks. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 12–16 inches. Flowers yellowish? June 1912." G. Forrest. No. 8305.

Not recorded hitherto from China.

Kingiella taenialis, Rolfe.

Doritis taenialis, Benth. : *Aerides taeniale*, Lindl.

"West China :—Shweli-Salween divide, Yunnan, epiphytic on rocks and trees. Lat 25° 30′ N. Alt. 6–7,000 ft. Plant of 6–9 inches. Flowers white and lake-purple. June 1918." G. Forrest. No. 17,543.

"Also Shweli Valley at 8,000 ft. August 1917." G. Forrest. No. 15,794.

Not previously recorded from China.

Liparis malleiformis, W. W. Sm. Sp. nov.

Species cum magnitudine habituque *L. longipedis*, Lindl. a qua bulbo brevi, labello omnino diverso differt.

Pseudobulbi approximati 3–3.5 cm. longi, anguste ovoidei. Folia plerumque duo, anguste oblanceolato-oblonga, circ. 25 cm. longa, ad 2.5 cm. lata, acuta vel acuminata, longe petiolatim angustata. Scapus erectus, folia aequans vel paululo longior; pars florifera circ. 10 cm. longa multiflora; pedunculus ebracteatus latissime alatus. Bracteae florales 5–9 mm. longae ovaria pedicellata aequantes. Flores mediocres flavi fragrantes. Sep-

ala circ. 4 mm. longa lineari-oblonga, acutiuscula. Petala sepalis subaequilonga linearia. Labellum e basi cuneata in laminam submalleiformem expansum circ. 3.5 mm. longum sed 5 mm. latum antice breviter mucronatum, a medio decurvum, callis obsoletis. Columna circ. 3 mm. longa leviter curvata. Fructus circ. 8 mm. longus obovoideus.

"West China :—Shweli-Salween divide, Yunnan, on boulders in open situations. Lat. 25° 30′ N. Alt. 7-8,000 ft. Plant of 9–14 inches. Flowers yellow, fragrant. August 1918." G. Forrest. No. 17,679.

Apparently the same is Henry No. 11,820A in Herb. Edin. from Mengtze at 5,000 ft.

Liparis Parishii, Hook. f.

"West China :—South end of Tengyueh Valley, Yunnan, in dry open pasture. Lat. 25° N. Alt. 6,000 ft. Plant of 6–16 inches. Petals, sepals, and labellum deep chocolate-maroon, rostellum orange-yellow. July 1912." G. Forrest. No. 8829.

"Western flank of the Tali Range, in shady situations in mixed forests. Lat. 25° 40′ N. Alt. 10,000 ft. Plant of 1–2 ft. Flowers deep crimson and yellow. September 1913." G. Forrest. No. 11,559.

Not recorded from China.

Listera flabellata, W. W. Sm. Sp. nov.

Species tantum cum *L. dentata*, King et Pantling comparanda a qua labello diverso recognoscitur.

Quoad habitum atque magnitudinem speciei citatae persimilis. Folia similiter. Inflorescentia brevior flexilis. Rachis puberula atque bracteae eis socii subsimiles. Flores parvi virides. Labellum flabelliforme circ. 3.5 mm. diametro textura tenuissimum, margine dentato-pectinatum, dentibus in cilia longa excurrentibus, lamina nervulis conspicuis in dentes abeuntibus flabellatim pererrata ; in *L. dentata* labellum carnosum reniforme linea mediana incrassata praeditum.

"Upper Burma :—Valley of the Chawng-maw-hka, at 8,000 ft. Flowers green. Amongst undergrowth on steep slopes beneath bamboos. July 1919." F. Kingdon Ward. No. 3414.

Listera micrantha, Lindl.

"Upper Burma :—Western spur of Imaw Bum. Alt. 10,000 ft. Rooted in humus amongst the scanty undergrowth of the Conifer forest. Flowers white. July 1919." F. Kingdon Ward. No. 3359.

Not previously recorded from Burma.

Listera pinetorum, Lindl. var.

Floribus ex collectore albidis a typo discrepat.

"Upper Burma :—Feng-shui-ling camp, 7–8,000 ft., in rain forest undergrowth, in deep shade on wet banks. Flowers white, labellum with dark green stripe down the centre. June 1914." F. Kingdon Ward. No. 1652.

Listera pinetorum, Lindl. var.

Columna brevissima a typo recedit.

"Upper Burma :—Feng-shui-ling camp, 7–8,000 ft.,on mossy banks by streams or amongst shorter undergrowth in rain forest. Flowers green. June 1914." F. Kingdon Ward. No. 1631.

These two orchids are closely allied to *L. pinetorum*, Lindl., *L. longicaulis*, King et Pantling, and *L. Wardii*, Rolfe. They come nearest to the first and show but slight variation from that species which does not appear to have been previously recorded from Burma.

Listera unguiculata, W. W. Sm. Sp. nov.

Species affinis *L. dentatae*, King et Pantling; labello dentato-pectinato congruit sed labello ipso ad medium in lobos late falcatos diviso differt.

Planta 20–40 cm. alta. Caulis sub foliis glaber ad 10 cm. altus. Folia duo opposita, cordata, obtusiuscula, circ. 3 cm. longa, circ. 2 cm. lata. Pedunculus 8–12 cm. longus bracteis raris ornatus furfuraceo-pubescens. Racemus 5–15 cm. longus 10–25-florus rhachi furfuraceo-pubescente; pedicelli 2–5 mm. longi; bracteae floriferae lanceolatae circ. 2 mm. longae. Flores virides. Sepala subaequalia ovato-lanceolata. Petala lanceolata circ. 2 mm. longa. Labellum circ. 6 mm. longum, 5 mm. latum, ambitu obovatum, ad medium fissum in lobos late falcatos margine dentato-pectinatos; unguis medio dentibus duobus patentibus triangularibus 1 mm. longis notatus; discus linea media inerassata pererratus; sinus inter lobos ambitu obovatus. Ovarium 2 mm. longum. Columna circ. 1 mm. longa.

"Upper Burma :—Hpimaw pass, in deep forest shade where there is little undergrowth at 10–11,000 ft. Flowers green. August 1914." F. Kingdon Ward. No. 1875.

"Upper Burma :—Laktang, in thin bamboo forest, growing on steep banks at 8–9,000 ft. Flowers pale green, column cream. July 1919." F. Kingdon Ward. No. 3350.

This species is well distinguished by the remarkable labellum shaped like a pair of pincers.

Microstylis khasiana, Hook. f.

"West China :—Divide between the Shweli and Tengyueh valleys, in thickets and rocky shady situations. Lat. 25° 10′ N. Alt. 6–7,000 ft. Plant of 4–8 inches. Flowers deep purple-lake. July 1912." G. Forrest. No. 8627.

New to China.

Odontochilus yunnanensis, Rolfe.

"Upper Burma :—Laking-hka valley, in limestone gorges, on wet shady banks under shrubs and trees. Alt. 4–5,000 ft. Flowers canary-yellow. 1914." F. Kingdon Ward. Nos. 1886, 1922.

New to Burma.

Orchis Wardii, W. W. Sm. Sp. nov.

Species ex affinitate *O. spathulatae,* Reichb. f. atque rhizomate elongato similiter munita; habitu multo robustiore, foliis haud longe petiolatis vulgo duobus evolutis labello omnino diverso notata.

Planta ad 23 cm. alta. Rhizoma validum elongatum horizontaliter repens. Caulis vaginis tubulosis 1–2 obtusis basi praeditus bifoliatus. Folia in partem petiolarem vix discretam caulem amplectantem angustata; lamina 11–14 cm. longa, ad 5.5 cm. lata, late elliptica, apice rotundata vel breviter acutata. Spica circ. 3 cm. longa plerumque 5–6-flora; bracteae inferiores fere 4 cm. longae supra decrescentes floribus multo longiores. Sepala subaequalia 8–9 mm. longa maculis purpureis notata; lateralia falcato-ovata obtusiuscula; dorsale ovatum cucullatum subobtusum. Petala circ. 7 mm. longa ovato-lanceolata apice obtusa. Labellum sepalis aequilongum ovatum apice obtuse angustatum, marginibus valde erosum atque corrugatum, vix trilobum, minutissime papillatum; calcar ovario paulo brevius cylindricum fere rectum. Pollinia anguste pyriformia, caudiculis brevibus, glandulis parvis in bursa rostellari celatis; staminodia parva; stigmata in fovea coalita.

"West China :—At Atuntzu and Doker-la on the Tibetan frontier, Yunnan. Alt. 11,000 ft. On open screes. June 1913." F. Kingdon Ward. Nos 447, 589.

Oreorchis discigera, W. W. Sm. Sp. nov.

Ex affinitate *O. micranthae,* Lindl. a qua structura labelli longe recedit; etiam affinis *O. Rolfei,* Duthie sed foliis solitariis, disco labelli majore differt.

Pseudobulbus circ. 2 cm. longus, ovoideus, basi fibrosus. Folia solitaria, lineari-lanceolata, ad 30 cm. longa, ad 2.5 cm.

lata, multinervia, infra petiolatim angustata, basi vaginata. Scapus ad 25 cm. altus, a latere pseudobulbi oriens, vaginis elongatis 2–3 praeditus; pars florifera 4–6 cm. longa, circ. 15-flora; bracteae circ. 5 mm. longae fere ad summum ovarium pertinentes lineari-lanceolatae acutissimae. Flores cum pedicello circ. 1 cm. longi. Sepala lateralia circ. 6 mm. longa, falcato-ovata, acutiuscula; dorsale lanceolatum, circ. 7 mm. longum, lateralibus angustius, acutum. Petala fere 6 mm. longa sepalis lateralibus subsimilia, viridi-brunnea, intus purpureo-striata. Labellum circ. 5 mm. longum, trilobum, brevissime unguiculatum, album, purpureo-maculatum, lobis lateralibus parvis auriculaeformibus, intermedio obovato. apice obscure lobulato ad basin disco magno bivalviconchiformi praedito; calcar nullum. Columna circ. 4 mm. longa, curvata, basi dilatata et concava; pollinia 4.

"Upper Burma:—At Feng-shui-ling; terrestrial orchid amongst rank undergrowth on a bank in bamboo forest (rain forest) at 8–9,000 ft. Flowers greenish-brown, petals striped with purple inside, labellum white, mottled with purple. June 1914." F. Kingdon Ward. No. 1640.

A species well distinguished from all but *O. Rolfei*, Duthie by the peculiar disc on the labellum. The disc resembles an open bivalve shell.

Otochilus alba, Lindl.

"West China:—In the Shweli Valley, Yunnan, on cliffs and boulders. Lat. 24° 42′ N. Alt 6,000 ft. Epiphytic plant of 9–14 inches. Flowers white, tinged orange at base. February 1918." G. Forrest. No. 16,168.

"Also on hills east of Tengyueh. Lat. 25° N. Alt. 7–8,000 ft. January 1913." G. Forrest. No. 9493.

New to China.

Otochilus Forrestii, W. W. Sm. Sp. nov.

Species affinis *O. porrectae*, Lindl. a quo sepalis latiusculis, labelli lobis lateralibus ad medium gynostemium attingentibus haud acutis, lobo intermedio late elliptico divergit.

Pseudobulbus in specimine aliquatenus manco circ. 3 cm. longus, 1.2 cm. latus, diphyllus. Folia in petiolum 1–2 cm. longum attenuata, in spec. nostro 11 cm. longa, circ. 2 cm. lata, lanceolata, acutata, nervis quinque (quam aliis indistinctis) magis conspicuis. Racemus proteranthus flexuosus circ. 8-florus foliis brevior. Bracteae cito deciduae non visae. Sepalum dorsale oblongum circ. 14 mm. longum 4 mm. latum, apice acutatum; lateralia dorsali similia subfalcata. Petala sepalis aequilonga, linearia, 1 mm. lata, acuta, patentia. Labellum

basi saccatum; lobi laterales ad medium gynostemium attingentes, falcato-oblongi, obtusiusculi circ. 6 mm. longi; lobus intermedius late ellipticus, 8 mm. longus, 5–5.5 mm. latus, apice abrupte acutatus. Gynostemium circ. 12 mm. longum.

"West China :—Hills to the east of Tengyueh, Yunnan, on rocks in side valleys. Lat. 25° N. Alt. 7–8,000 ft. Epiphytic plant of 2–4 ft. Sepals white, tinged dull orange exterior; petals white; rostellum and labellum dull apricot-orange. December 1912." G. Forrest. No. 9371.

This species is closely akin to *O. porrecta,* Lindl. but the latter differs widely in the structure of the lip. See King and Pantling in Annal. Roy. Bot. Gard. Calc. viii, 142, t. 198. The measurements given by Kränzlin in Pflanzenreich—Orchidaceae —Coelogyninae p. 162 accord however poorly with Pantling's figure already cited.

Phajus sp.

Species ex affinitate *P. maculati,* Lindl.; quoad columnam villosulam cum ea specie congruit sed bracteis multo minoribus, floribus laxioribus sepalis minoribus, pedicellis longioribus, fructu haud globoso-ovoideo recedit.

Pseudobulbi non visi. Folia 20–30 cm. longa, circ. 6 cm. lata, lanceolata, apice acuminata, basi petiolatim angustata, in sicco papyracea, plicata, utrinque glabra. Scapus saltem 30 cm. altus multiflorus; bracteae circ. 1 cm. longae plus minusve oblongae concavae obtusiusculae pedicellos subaequantes ovario multo breviores. Flores flavi. Sepala 2.3–2.5 cm. longa, circ. 1 cm. lata, oblonga, obtusa. Petala subsimilia angustiora. Labellum sepalis subaequale lobis lateralibus angustis intermedio ei *P. maculati* subsimili; calcar 1 cm. longum subacutum. Columna crassa 1.5 cm. alta parte anteriore villosula. Ovarium 2–2.5 cm. longum costatum.

"Upper Burma :—In the Naung-Chaung Valley at 6–7,000 ft.; growing in clumps on leafy soil; on shale rock by steep cliffs in forest, deep shade and damp. Flowers yellow, labellum fringed with brown. July 1914." F. Kingdon Ward. No. 1739.

The hairy column and yellow flowers distinguish this species from all those of the area except *P. maculata,* Lindl. The material is unfortunately somewhat scanty and does not permit of a completely adequate analysis. If not an abnormal form of *P. maculata,* it is a new species.

Pholidota articulata, Lindl.

"West China :—Flank of volcanic mountain to the north-west of Tengyueh, Yunnan, on rocks. Lat. 25° 10′ N. Alt. 6–7,000

ft. Epiphytic plant of 6–8 inches. Sepals and petals pinkish-rose; labellum the same, with a deeper shade of orange-pink down centre towards base; fragrant. June 1912." G. Forrest. Nos. 8304, 8320.

"Shweli Valley. Lat. 25° N. Alt. 6,000 ft. Flowers pinkish-orange. July 1912." G. Forrest. Nos. 8817, 18,586.

New to China.

Pholidota Convallariae, Hook. f.

"West China :—Lava bed west of Tengyueh, Yunnan, on rocks. Lat. 25° N. Alt. 5,000 ft. Plant of 9–15 inches. Flowers creamy-white, fragrant. May 1912." G. Forrest. No. 7799.

New to China.

Pholidota imbricata, Lindl.

"West China :—Yung-peh mountains, Yunnan, on trees and cliffs. Lat. 26° 42′ N. Alt. 8–9,000 ft. Epiphytic plant of 6–9 inches. In fruit. September 1918." G. Forrest. No. 17,149.

Apparently not recorded from China.

Pholidota sp.

Species affinis *Ph. calceatae,* Reichb. f. et *Ph. Convallariae,* Hook. f. et *Ph. yunnanensi,* Rolfe a quibus labello 4 mm. longo bilobo lobis rotundatis apice emarginato distingui videtur.

"Upper Burma :—Salween Valley above Kunatong, 5–7,000 ft. Small tuberous orchid on trees and rocks. January 3rd, 1914." F. Kingdon Ward.

This appears to be a distinct species but the material is scarcely adequate for description.

13572 **Pleione scopulorum,** W. W. Sm. Sp. nov.

Species affinis *P. Hookerianae,* (Lindl.) T. Moore a qua pseudobulbis diphyllis inter alia distinguitur; foliis synanthis, labello 7-fimbriato-nervoso, antice minute erosodenticulato appropinquat.

Pseudobulbi ovati circ. 1.5 cm. longi, fere 1 cm. crassi, annulo parvo praediti, diphylli. Folia ad 15 cm. longa, circ. 1.5–2 cm. lata, lanceolata, breviter acuminata, basi longe petiolatim angustata, in sicco membranacea, multinervia, nervis tribus tantum prominentibus. Scapus foliis fere omnino evolutis synanthus et ea subaequans, erectus, uniflorus, basi vaginis tubulosis membranaceis tandem in fibras parallelas solutis circumdatus;

bractea anguste obovata vel suboblonga, obtusa, circ. 2 cm. longa, vix ad summum ovarium attingens. Flos subnutans laete roseus. Sepala anguste ovata, circ. 2.5 cm. longa, 9 mm. lata, acuta. Petala sepalis aequilonga, oblonga, acutiuscula, vix angustiora. Labellum e basi latissime truncata obscure trilobum, lobis lateralibus rotundatis medio truncato, circ. 2.5 cm. longum, ad 3 cm. latum, antice eroso-denticulatum, nervis mediis 7 fimbriatis. Columna 1.7 cm. alta.

"West China :—Mekong-Salween divide, Yunnan, on ledges of cliffs and humus-covered boulders in shady situations. Lat. 28° 12′ N. Alt. 9,000 ft. Plant of 6–9 inches. Flowers bright scarlet-rose, labellum darkest. July 1917." G. Forrest. No. 14,230.

Risleya atropurpurea, King et Pantling.

"Upper Burma :—Ridge of Naung-Chaung, Nwai divide, on granite ridge about 10,000 ft. In deep shade of bamboo forest in damp leafy soil. Flowers dark green, almost black. July 1914." F. Kingdon Ward. No. 1780.

A rare monotypic genus previously recorded from the Sikkim Himalaya at 13,000 ft.

Saccolabium acutifolium, Lindl.

"West China :—Hills to the north of Tengyueh, Yunnan, on rocks in pine forest. Lat. 25° 15′ N. Alt. 7,000 ft. Epiphytic plant of 6–12 inches. Corolla fleshy; petals and sepals dull deep olive-yellow with large blotches of crimson-lake. Labellum deeply pouched, saccate, with similar markings, lighter coloured and fringed round margin. May 1912." G. Forrest. No. 8549.

"Shweli Valley, Yunnan, in open situations on trees. Lat. 25° 20′ N. Alt. 6,000 ft. Epiphytic plant of 6–8 inches. Flowers yellow, spotted deep purple; fragrant. August 1917." G. Forrest. No. 15,906.

New to China.

Saccolabium gemmatum, Lindl.

"Upper Burma :—Htawgaw, valley of Naung-Chaung, Lashi country, at 5,000 ft., forming dense matted tufts in trees (alders). Flowers purple, petals cream-tipped. May 1914." F. Kingdon Ward. No. 1556.

Apparently new to Burma.

Sarcanthus pallidus, Lindl.

"West China :—Lava bed west of Tengyueh, Yunnan, in open situations on lava rocks. Lat. 25° N. Alt. 4–4500 ft. Epi-

phytic plant of 2 ft. Flowers, sepals and petals deep purple-maroon; labellum white, flushed purple. August 1919." G. Forrest. No. 18,284.

"Szemao, Yunnan, East mountains, at 6,000 ft.; on cliffs." A. Henry. No. 13,080.

New to China.

Sarcopodium fuscescens, Lindl.

"West China :—Hills to the north of Tengyueh, Yunnan, on rocks. Lat. 25° 10′ N. Alt. 7,000 ft. Epiphytic plant of 6–10 inches. Flowers dull yellow, labellum deep lake. July 1912." G. Forrest. No. 9047.

New to China.

Sarcopodium rotundatum, Lindl.

"West China :—Lava bed to west of Tengyueh, Yunnan, epiphytic on rocks. Lat. 25° N. Alt. 5,000 ft. Plant of 6–12 inches. Sepals and petals dull olive-yellow, slightly veined rose on exterior; rostellum yellowish-white; labellum yellowish-white with a margin of deep crimson-lake; fragrant. May 1912." G. Forrest. No. 7770.

"Shweli Valley, Yunnan, on trees in shady situations. Lat. 25° N. Alt. 5–6,000 ft. Epiphytic plant of 6–9 inches. In fruit. May 1912." G. Forrest. No. 8043.

"Shweli-Salween divide, Yunnan, on rocks and trees. Lat. 25° N. Alt. 9,000 ft. Epiphytic plant of 2–3 ft. Flowers olive-yellow and brown with maroon markings, fragrant. April 1914." G. Forrest. No. 12,366.

"Shweli Valley. Lat. 25° 40′ N. Alt. 5–6,000 ft. Creeping epiphytic plant of several feet. Sepals and petals creamy-white, labellum slightly margined and marked brown. July 1919." G. Forrest. No. 18,120.

New to China.

26132 **Stauropsis polyantha,** W. W. Sm. Sp. nov.

Species affinis *S. undulatae,* Benth. a quo inflorescentiis elongatis multifloris nunc ramosis, floribus fere duplo majoribus differt; *S. shanica,* Phillimore et W. W. Sm. etiam affinis caulem laevem racemumque pauciflorum habet.

Caulis ad 60 cm. longus ut in *S. undulata* verruculosus. Folia plerumque 10–11 cm. longa, 1.5–2.5 cm. lata, oblonga, obtusa, inaequaliter retusa, basi vix angustata. Pedunculi foliis oppositi vel alterni, 10–25 cm. longi, validi, rigidi, bracteis vaginiformibus remotis instructi. Racemi ad 30 cm. longi, nunc basi ramosi, multiflori, bracteis ovatis obtusis cucullatis 5–10 mm. longis muniti. Flores circ. 6–7 cm. diametro albi roseo-

suffusi vel flavido-brunneo-maculati vel ad labellum violaceo-purpurei. Sepala petalaque ad 3.5 cm. longa, oblanceolata, apice acutata, reflexa, marginibus undulatis. Labellum fere 2 cm. longum, basi columnae adnatum; hypochili auriculae rotundatae columnam amplectantes; pars labelli adaxialis cymbiformis, pars abaxialis latere compressa carnosa submalleiformis. Columna brevis.

"Upper Burma :—Kachin Hills; 3,000 ft.; epiphytic in forest. April 1913." F. Kingdon Ward. No. 207.

"West China :—Shweli Valley, Yunnan, on trees. Lat. 25° 20′ N. Alt. 6,000 ft. Epiphytic plant of 1-2 ft. Flowers white with yellow-brown markings, flushed rose exterior; fragrant. May 1913." G. Forrest. No. 12,039.

"Upper Burma :—Taping Valley, on trees in jungle. Lat. 24° 30′ N. Alt. 2,500 ft. Epiphytic plant of 2 ft. Flowers white, flushed rose exterior. April 1917." G. Forrest. No. 13,729.

"West China :—Shweli Valley, Yunnan, on trees. Lat. 25° 20′ N. Alt. 6–7,000 ft. Epiphytic plant of 2 ft. Flowers white with labellum violet-purple; fragrant. June 1917." G. Forrest. No. 15,806, 17,973.

Tainia minor, Hook. f.

"West China :—Shweli-Salween divide, Yunnan, in shady situations on the margins of thickets. Lat. 25° 10′ N. Alt. 7,000 ft. Plant of 12–16 inches. Flowers yellow. August 1918." G. Forrest. No. 17,652.

New to China.

"Upper Burma :—Laktang; 7 8,000 ft. Outer perianth lobes dull brownish-yellow, with fine stripes. Lip bright yellow. Flowers nodding. In rain forest, growing in leaf-mould in deep shade. June 1919." F. Kingdon Ward. No. 3229.

Apparently not recorded for Burma.

Vanda Bensoni, Veitch et Reichb. f.

"West China :—On the outskirts of the lava-bed west of Tengyueh, Yunnan, on trees. Lat. 25° N. Alt. 5,000 ft. Epiphytic plant of 12–14 inches. Flowers thick, fleshy and fragrant. Ground colour of sepals and petals dull olive-yellow, irregularly veined and netted purplish-lake; labellum a darker shade. Rostellum similar. May 1912." G. Forrest. No. 7665. March 1913. No. 9728.

Not previously recorded from China.

Zeuxine affinis, Benth.

"West China :—Shweli-Salween divide, Yunnan, in open situations on the margins of bamboo brakes. Lat. 25° 30′ N.

Alt. 8,000 ft. Plant of 4–8 inches. Flowers bright orange-yellow. August 1913." G. Forrest. No. 11,914.

Apparently new to China.

2613 **Zeuxine inverta**, W. W. Sm. Sp. nov.

Species anomala; structura floris cum Zeuxine satis quadrat sed flos resupinatus; folia in hac specie ad squamas reducta.

Planta 7–15 cm. longa, 2 mm. crassa, erecta, glabra, rhizomate elongato pauci- et brevi-ramoso circ. 2 mm. crasso. Caulis squamis amplexicaulibus 6–9 membranaceis 5–7 mm. longis plus minusve approximatis (vaginis foliorum in *Zeuxine* normalium subsimilibus) bene praeditus et interdum subcelatus. Spica circ. 2.5 cm. longa, 5–7-flora, glabra; bracteae 8–9 mm. longae, ovato-lanceolatae, membranaceae; flores resupinati 13–14 mm. longi aurantiaci. Sepala lateralia falcato-ovata, obtusa, circ. 6 mm. longa; sepalum dorsale multo minus circ. 4 mm. longum obtusum cum petalis cohaerens concavum. Petala lineari-lanceolata, falcata, circ. 4 mm. longa, acuta. Labellum columnae adnatum sepala paululo excedens apice circ. 4 mm. latum; unguis circ. 3 mm. longus angustatus marginibus erectis integris; lobus terminalis bilobulus segmentis divaricatis subrotundis margine irregulariter erosulis; saccus basalis brevissimus callis duobus praeditus. Columna brevis bialata; stigmata duo lateralia; anthera ovata acuta. Ovarium circ. 9 mm. longum glabrum.

"West China :—Hills to the north-west of Tengyueh, Yunnan, in shady situations amongst rhododendrons. Lat. 25° N. Alt. 7,000 ft. Plant of 3–6 inches. Flowers orange. July 1912." G. Forrest. No. 8551.

A very peculiar plant. The flowers are resupinate—the labellum forming a kind of hood over the flower. The form of the labellum is quite that of *Zeuxine* and not of *Hetaeria* which has a superior lip.

Zeuxine nervosa, Benth.

"West China :—Tali Range, Yunnan, in shady situations amongst scrub. Lat. 25° 40′ N. Alt. 11,000 ft. Plant of 9–14 inches. Flowers green. May 1914." G. Forrest. No. 12,382.

Not recorded from China.

Zeuxine pumila, King et Pantling.

"Upper Burma :—Naung Chaung Valley, at 8–9,000 ft., on leaf mould in deep shade of forest. Flowers white. 1914." F. Kingdon Ward. No. 1722.

New to Burma.

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NOTES

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Rhododendron: Diagnoses Specierum Novarum.

BY

PROFESSOR SIR ISAAC BAYLEY BALFOUR, F.R.S.

II.

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,,	sigillatum, Balf. f. et Forrest, p. 294.	Lacteum (Dryophyllum).
,,	sinovaccinioides, Balf. f. et Forrest, p. 295.	Vaccinioides.
,,	sperabile, Balf. f. et Farrer, p. 297.	Haematodes.
,,	spilotum, Balf. f. et Farrer, p. 298.	Neriiflorum.
,,	spodopeplum, Balf. f. et Farrer, p. 299.	Campylogynum (Aureum).
,,	sub-erosum, Balf. f. et Forrest, p. 301.	Scabrifolium.
,,	tephropeplum, Balf. f. et Farrer, p. 302.	Campylogynum (Aureum).
,,	torquatum, Balf. f. et Farrer, p. 303.	Sanguineum.
,,	trichopodum, Balf. f. et Forrest, p. 304.	Triflorum.
,,	vicinum, Balf. f. et Forrest, p. 305.	Lacteum (Dryophyllum).

Rhododendron aechmophyllum, Balf. f. et Forrest.

Frutex ad 1 m. altus dense et breviter ramosus. Ramuli tenues stricti annotini circ. 1 mm. diam. rubescentes breviter puberuli et squamis flavis sparsissime praediti. Alabastra ovoidea parva circ. 3 mm. longa; perulae exteriores ovatae puberulae extus dense lepidotae. Folia petiolata ad 5.5 cm. longa; lamina coriacea rigida lanceolata nunc curvata ad 5 cm. longa 1.5 cm. lata utrinque attenuata, acuminata mucrone hydathodali apiculato terminata, margine tenuiter cartilaginea fere plana plus minusve minute scabriuscula nunc setulis paucis praecipue basim versus ciliata, basi cuneata; supra pallide olivacea reticulata elepidota plus minusve papulosa et puberula, costa media vix sulcata, venis primariis utrinsecus circ. 8–12 paullo elevatis; subtus pallidior nunc pallide fulva subreticulata venulis ultimis subrubescentibus epilosa inconspicue et distanter lepidota diametro intervallorum papillatorum squamis multo minore, squamis tenuibus primo pallide viridibus ex umbone lato et instita aequilata membranacea constructis postea hic et illic annulo flavo vel rufescente resinoso-infiltrato coloratis, costa media flavida vel basi erubescente, venis primariis fere occultis; petiolus ruber sulcatus ad 5 mm. longus ut ramuli vestitus. Flores in umbellas solitarias terminales 4–5-floras dispositi; bracteae persistentes crustaceae mucronulatae extus lepidotae intus apicem versus sericeae margine apiceque albo-ciliatae, exteriores rotundatae, interiores obovato-spathulatae plus minusve truncatae circ. 1 cm. longae 5 mm. latae; bracteolae lineares pilosae lepidotae pilocristatae circ. 1.2 cm. longae; pedicelli circ. 1 cm. longi sub anthesi bracteis inclusi glabri sub flore haud ampliati. Calyx cupuliformis sparsissime lepidotus margine obscure 5-lobatus. Corolla rosea ? circ. 2.5 cm. longa infundibuliformi-campanulata intus puberula; lobi 5 ovales circ. 1.2 cm. longi 8 mm. lati. Stamina 10 inaequalia; filamenta puberula. Discus glaber. Gynaeceum circ. 3.5 cm. longum corollam superans; ovarium cylindricum truncatum sulcatum lepidotum circ. 4 mm. longum; stylus glaber. Capsula cylindrica paullo curvata circ. 1.5 cm. longa 4 mm. lata russata leviter lepidota. Species Seriei Triflori.

S.W. Szechwan. Mu-li Mts. Lat 28° 12′ N. 11–12,000 ft. Amongst scrub and on open stony meadows. Shrub of 3–4 ft. Flowers probably rose. Unripe fruit. Forrest **16,790.** Aug. 1918.

Near *Rh. hormophorum*, Balf. f. et Forrest but has no scales on upper surface of leaf and is not nearly so hairy.

Rhododendron aiolopeplum, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Rami subcrassi annotini ad 4 mm.

diam. indumento griseo vel fulvo tenui pilis paucis intertextis induti, seniores plus minusve fungis nigris infesti. Alabastra elongata sursum attenuata; perulae extimae caudatae indumento griseo, intermediae oblongo-ovales dorso pilis albidis et rufescentibus puberulae margine rufo-ciliatae. Folia petiolata ad 10.5 cm. longa; lamina coriacea lanceolata vel oblongo-lanceolata circ. 9 cm. longa 2.5 cm. lata sursum attenuata, apice rostrato-apiculata mucrone tuberculato terminata, margine plana, basi obtusa; supra laete viridis nunc purpureo-tincta nitens sublaevis vestigiis indumenti pilosi griseis obscure notata, costa media sulcata pilis vestigialibus plus minusve impleta, venis primariis utrinsecus ad 12 obscuris; subtus helvola variolata primo pallidior indumento completo laevi coactili persistente bistrato e pilis in strato supero longe ramosis intertextis in strato infero rosulatim breviter et late ramosis constructo vestita, costa media elevata; petiolus ad 1.3 cm. longus ut rami vestitus. Flores in umbellas breviter racemosas terminales circ. 8-floras dispositi, rhachi circ. 8 mm. longa puberula; bracteae et bracteolae mox deciduae; pedicelli subinaequales ad 2 cm. longi floccosi eglandulosi. Calyx carnosulus parvulus vix 1 mm. longus; lobi 5 rotundati glabri nunc minutissime ciliati. Corolla alba emaculata vix 3 cm. longa campanulata extus intusque glabra; lobi rotundati emarginati breves circ. 8 mm. longi 1.5 cm. lati. Stamina 10 inaequalia, longiora circ. 2.5 cm. longa corolla paullo breviora antheris oblongis circ. 2.25 mm. longis, breviora circ. 1.5 cm. longa antheris circ. 1.5 mm. longis; filamenta sparsissime puberula. Discus sparsim puberulus. Gynaeceum stamina longiora aequans corolla paullo brevius circ. 2.5 cm. longum; ovarium conoideum sulcatum truncatum circ. 3.5 mm. longum sparsim puberulum; stylus glaber sub stigmate lobulato vix expansus. Species ex affinitate *Rh. levistrati*, Balf. f. et Forrest.

Eastern N.W. Yunnan. Mountains E. of Chungtien. Lat. 27° 55′ N. 12,000 ft. In rhododendron thickets. Shrub of 6–8 ft. Flowers white, faintly flushed rose without markings. Forrest **16,467.** July 1918.

A plant very near *Rh. levistratum*, which is a Mekong-Salween plant from N. of Atuntzu, but has leaves slightly broader and smaller, flowers smaller white glabrous spotted, with long stamens and style about equal and both shorter than corolla and the ovary is sparingly floccose. This is one of a phylum showing several small variations such as we find in *Rh. helvolum* and running into *Rh. dryophyllum*.

Rhododendron aiolosalpinx, Balf. f. et Farrer.

Frutex venustus epilosus eglandulosus (ovario excepto). Rami annotini ad 2 mm. diam. Alabastra elongato-ovoidea; perulae

exteriores caudatae glabrae sed minute ciliatae. Folia petiolata 10 cm. longa; lamina crasse coriacea obovata ad 9 cm. longa 4 cm. lata, apice rotundata mucrone rubro tuberculato terminata, margine plana saepe purpurata, deorsum in petiolum inaequaliter angustata; supra pallide viridis nunc atroviridis et saepe cera plus minusve glauca, costa media tenui, venis primariis utrinsecus ad 12 paullo prominulis; subtus flavida pilis sebaceis profusis vestita; petiolus ad 1 cm. longus. Flores in umbellas terminales 3 5-floras dispositi; bracteolae filiformes circ. 1 cm. longae glabrae (apice pili-cristato excepto); pedicelli vix 1 cm. longi. Calyx foliaceus cupuliformis 1 cm. longus vel ultra omnino glaber; cupula kermesina; lobi 5 integri nunc cupulam aequantes nunc 1 2 mm. longi. Corolla tubuloso-campanulata nunc alba nunc coccinea et in coloribus intermediis plurimis varians glabra circ. 4.5 cm. longa vel ultra; tubus septis 5 incompletis divisus basi 5-gibbosus sacculo quoque nectarifero et intensius colorato; lobi 5 magni rotundati emarginati circ. 1.5 cm. longi 2.5 cm. lati. Stamina 10 inaequalia corolla multo breviora, longiora circ. 3.5 cm. longa, breviora circ. 2.5 cm.; filamenta basi dense puberula. Discus glaber. Gynaeceum circ. 4 cm. longum; ovarium tenue circ. 6 mm. longum glandulis rubris sessilibus vestitum; stylus glaber stigmate angusto terminatus.

N.E. Upper Burma, Chimili Pass. 11–12,000 ft. A small graceful bush extremely profuse in lovely flowers from pure or creamy white through every shade of waxy fleshy rose to clear rich pink and even crimson, no scent. Five honey glands at the base in almost crested pinched-in folds. A very lovely plant indeed, common on open ribs of the bamboo brake and even below at 11,000 ft. on the flat rill-sides of the upper torrent courses in half shade. N.B. Leaf reverse creamy yellow, purple-edged. See painting. Farrer No. **926.** May 16, 1919.

N.E. Upper Burma, Chawchi Pass, Nyitadi, etc. Alt. 10,500–11,000 ft. Flowering in the snow at 10,800 ft. This appears as a small straggly bush here not attaining such proportions (as far as seen) as it does on the Hpimaw ridge. White and creamy tones too vastly preponderate here over pink ones. On the Maguchi Pass the plant is very fine, a 5-foot bush in wide jungles over the open alp. But here too the flowers though notably large are almost invariably cream-white. Farrer No. **1547.** May 15, 1920.

This plant which pleased Mr Farrer so much is one of the phylum of *Rh. eclecteum* of the Thomsoni Series. It is noteworthy as being a particularly glabrous plant—the glandular ovary and the puberulous stamens are appendaged parts. The leaves are smaller than those of *Rh. eclecteum*, Balf. f. et Forrest

and of *Rh. brachyandrum*, Balf. f. et Forrest. The variation in flower colour described by Mr Farrer is remarkable and should make the plant a useful one in Horticulture.

4734 **Rhododendron aischropeplum**, Balf. f. et Forrest.

Frutex fere 2 m. altus. Rami crassi ex incrementis annuis brevissimis aedificati foliis apicem versus congestis et perulis praeteritis marcidis dense vestiti, seniores nigricantes. Alabastra anguste ovoidea acuta haud glutinosa; perulae exteriores haud lanatae extimae sublignosae a basi latiore acuminatae carinatae subtomentosae, interiores ovatae mucronatae dorso subtomentosae eglandulosae ciliatae, intimae ligulato-spathulatae ad 2.5 cm. longae 6 mm. latae acutae ciliatae. Folia ad 10 cm. longa petiolata; lamina crasse coriacea rigida lanceolata acuminata mucrone tuberculato prominulo erecto terminata, margine recurva, deorsum in petiolum latum brevem gradatim angustata; supra opaca olivacea demum saepe purpurascens in modum squali corii rugulosa pilis rufis detersilibus plus minusve praedita glabrescens, costa media sulcata dense rufo-pilosa, venis primariis utrinsecus ad 12 inconspicuis; subtus sordide flavida ex toto indumento persistente denso crasso bistrato induta, strati superi pilis longe ramosissimis fibrilliformibus intertextis leviter coloratis, strati inferi e rosulis laxe dispositis incoloratis ramisque vesiculosis brevibus compositis, costa media elevata; petiolus complanatus circ. 4 mm. latus 5 mm. longus dense lanatus. Flores in racemo-umbellas compactas parvas plurifloras dispositi, rhachi pubescente; bracteae persistentes exteriores rotundatae mucronatae extus rufo-tomentosae, interiores oblongo-ovales membranaceae apice rotundatae; bracteolae minutae filiformes circ. 5 mm. longae pilosae; pedicelli vix 1 cm. longi rufo-pilosi et dense glandulosi sub calyce expansi. Calyx minutus cupulam glandulosam margine pentagonam exhibens. Corolla infundibuliformis circ. 2.7 cm. longa alba vel flavido-alba kermesino-maculata varo postico magno pallido notata extus glabra intus puberula basi gibbosa; lobi 5 rotundati circ. 1 cm. longi 1.5 cm. lati. Stamina 10 circum stylum aggregata inaequalia corolla et gynaeceo breviora, longiora circ. 1.8 cm. longa, breviora 1 cm.; filamenta puberula. Discus glaber. Gynaeceum circ. 2.2 cm. longum; ovarium circ. 2 mm. longum conoideum truncatum sulcatum dense glandulosum apice paullo pilocristatum; stylus validus sub stigmate lobulato haud incrassatus. Species Seriei Roxieani.

Western N.W. Yunnan. Mekong-Salween divide. Lat. 28° 20′ N. 12–13,000 ft Open rocky moorland and on the margins of pine forests. Shrub of 4–6 ft. Flowers white, occasionally flushed rose with deep crimson markings. Forrest **14,061.** June 1917.

Western N.W. Yunnan. Without precise locality. In fruit Forrest **16,957.** Sept. 1918.

Easily told in the Roxieanum Series by its dirty yellowish indumentum and then it has a glandular ovary. The hairs of the indumentum are finer than in *Rh. Roxieanum* and *Rh. recurvum*. Note also the bud-scales.

Rhododendron amaurophyllum, Balf. f. et Forrest.

Frutex ad 6 dm. altus multoramosus. Rami adscendentes stricti divaricati perulati annotini circ. 1.5 mm. diam. squamis pluribus stipitatis imbricatim fulvo-lepidoti estrigillosi, deinde griseo-cinerei. Folia breviter petiolata ad 2.5 cm. longa; lamina crasse coriacea oblongo-ovalis vel ovalis ad 2.3 cm. longa 1 cm. lata, apice rotundata mucrone stipitiformi terminata, margine in juventute remote setuloso-ciliata deinde plus minusve eciliata, basi obtusa saepe inaequalis; supra nigro-viridis subopaca squamis albidis siccis copiose pruinosa, costa media suberubescente sulcata; subtus fulvido-rufa ubique imbricato-lepidota squamis paucis majoribus subintensius coloratis uniformiter inter minores distributis, costa media prominula sparsim lepidota; petiolus circ. 2 mm. longus ut rami vestitus. Flores solitarii vel bini ad apicem ramorum; bracteae crustaceae plus minusve rotundatae interiores circ. 6 mm. diam. plus minusve puberulae et ciliatae sub anthesi persistentes pedicellorum basim cingentes; bracteolae filiformes circ. 6 mm. longae pilo-cristatae; pedicelli purpurei erecti vix 2 cm. longi squamulis plus minusve stipitatis dense induti. Calyx apertus circ. 6 mm. longus fere ad basim 5-partitus; lobi ovales circ. 4 mm. lati dorso lepidoti et plus minusve puberuli, intus dense sericei, setuloso-ciliati. Corolla subrotata cyaneo-purpurea emaculata circ. 2.5 cm. longa; tubus brevis crassiusculus circ. 2.5 mm. longus intus fauce puberulus; limbus 5-lobatus extus puberulus et lepidotus; lobi ovales vel oblongo-ovales circ. 1.5 cm. longi 1 cm. lati. Stamina 10 corolla gynaeceoque breviora; filamenta supra basim brevem floccoso-villosa. Discus dense puberulus. Gynaeceum corollam subaequans; ovarium petasiforme truncatum squamulis parvis dense vestitum; stylus coccineus glaber; stigma discoideum. Species Seriei Saluenensis.

S.E.Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 10′ E. Open moist situations amongst scrub and rocks. Shrub of 2–2½ ft. Flowers deep purplish-crimson. Forrest No. **18,905.** July 1919.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Shrub of 1½–2 ft. Leaves ovate ⅓–½ × ¼–½ inch dark green and scaly above, mealy rufous beneath. Flowers solitary or in pairs, terminal on stout pedicels of 1–1½ inches. Calyx coloured lepi-

dote or hairy. Corolla open 1–1½ inches across, *blue* tinged purple without markings. Forrest No. **19,918.** 1921.

An estrigillose species of the Saluenense Series. Forrest's gatherings of 1919 have the flowers mostly in a monstrous condition—the calyx and corolla being much enlarged and leathery, the stamens and gynaeceum more or less abortive. Perfect flowers in the 1921 collections enable me to give a description of the plant as a new species. As such it is readily recognised by the dark black-green of the upper leaf surface frosted with peltate scales quite like what is found in *Rh. chameunum*. Balf. f. et Forrest from further south (Kari Pass and Li-ti-ping in Yunnan) but that species has much smaller leaves and has also densely strigillose stems.

Rhododendron aperantum, Balf. f. et Ward.

Fruticulus late patens vix 2 dm. altus. Rami crassi additamento annuo brevissimo per annos plurimos perulati, in juventute sebaceo-floccosi; perulae extimae rotundatae apiculatae interiores a basi lata ligulatae margine apiceque rufo-pilosae dorso epilosae. Folia breviter petiolata ad 4 cm. longa ad apicem ramorum aggregata; lamina crasse coriacea rigida ovalis vel obovalis ad 3.5 cm. longa 2 cm. lata, apice rotundata vel late obtusa mucronatim apiculata, margine cartilaginea nunc recurva, basi angustata; supra laete viridis opaca saepe purpurascens maturitate glabra saepe subrugulosa et subbullata, costa media anguste sulcata venisque primariis utrinsecus ad 8 impressis; subtus primo albido-grisea laevis intense cerifera demum brunneo-viridis, costa media elevata sparsim sebaceo-floccosa (in juventute lamina utrinque plus minusve pilis sebaceis floccosis detersilibus induta); petiolus glabrescens 5 mm. longus. Umbella 4-flora; bracteae intimae membranaceae flavidae oblongae truncatae et apiculatae cucullatae sericeae ad 3 cm. longae; bracteolae filiformes ad 1 cm. longae sericeae; pedicelli ad 2 cm. longi setulis glandulosis vestiti et pilis sebaceis paucis intermediis praediti. Calyx cupuliformis submembranaceus circ. 5 mm. longus; cupulae extus glabrae margo undulatus et setuloso-glandulosus. Corolla magna rosea tubuloso-campanulata circ. 4.5 cm. longa 5-loba; lobi rotundati circ. 1 cm. longi 1.7 cm. lati. Stamina 10 circum stylum aggregata subaequalia circ. 2.5 cm. longa; filamenta deorsum dilatata glabra. Discus glaber. Gynaeceum circ. 3.7 cm. longum; ovarium circ. 5 mm. longum conoideum truncatum sulcatum setulis glanduliferis et pilis fasciatis adpressis vestitum; stylus glaber stigmate parvo. Species Seriei Neriiflori.

N.E. Upper Burma. Chawchi Pass. Alt. 12,000 ft. This may = Farrer 1184 of which only a belated flower was seen.

Anyhow it is a remarkably lovely plant covering the open high alpine slopes for miles in company with Farrer 1672 [*Rh. calox-anthum*], Farrer 1669 [*Rh. chactomallum*], Farrer 1627 [*Rh. charitopes*], Farrer 1626 forming an indescribable riot of colour. A small spreading bush of 3 9 inches with very large flowers typically of a most beautiful clear rose-pink, but varying to all the adjacent shades. (For a hybrid see Farrer 1731.) Farrer No. **1671.** July 1920.

The dried specimens confirm Mr Farrer's expression regarding the beauty of this plant. The flowers are remarkably large. Mr Farrer refers to his No. **1184,** a plant from the Chimili Alps at 12,900 ft. collected Aug. 3, 1919, the field ticket of which says "Prevalent on the higher open slopes, a sturdy little bush 12 inches high by 24 across, always neat and stocky with the leaves equally stiffly and neatly arranged. All the flower was over, but a lucky secondary bloom reveals it as very pretty—waxy or flesh white flushing to rose between the lobes and with the five glands at the base of deep carmine." He suggests that No. 1184 is the same species as 1671. It seems to be so but a much smaller form in the way of flower (Note—they are secondary flowers).

Then Kingdon Ward under No. **3301** has sent a plant with the following field ticket :—

N.E. Upper Burma. "Western spur of Imaw Bum. Alt. 10,000–11,000 ft. Forms thick matted carpets on granite rocks or precipitous moss-covered slopes under the bamboos associated with Ward No. 3267, much less common than the latter. *Saxifraga purpurascens* also growing with it. Leaves dark green above, light glaucous green beneath. A foot or less high. Flowers over. 2.7.19.

22.7.19. A plant found in flower at about 12,000 ft. Very common towards the summit of Imaw Bum with Ward Nos. 3302, 3303, 3365. Flowers bright crimson, no spots."

The flowers in Ward's specimens are a little smaller than in Farrer's Chawchi Pass plant.

The plant is one that in the matter of underleaf covering belongs to the Neriiflorum Series—being quite like *Rh. neriiflorum* in respect of it. Its leaf-shape and the squat truncate ovary with glabrous style suggest its place in the Sanguineum Series. If I place it here in Neriiflorum I am influenced by the consideration that the leaf must be seen whenever the plant is before one. Its character is therefore accessible, whilst flowers may be absent.

Rhododendron araliaeforme, Balf. f. et Forrest.

Frutex ad 5 m. altus pauci-ramosus. Rami stricti in prima juventute dense rubro-glandulosi mox glabrescentes, annotini glauco-purpurei circ. 3.5 cm. diam. glaberrimi axillis foliorum

delapsorum exceptis. Alabastrorum perulae extimae rotundatae dorso subglutinoso-puberulae, interiores extus rubro-glandulosae et glutinoso-puberulae, intimae longe membranaceae flavidae rubro-glandulosae et puberulae. Folia longe petiolata magnitudine varia nunc ad 16 cm. longa nunc circ. 4 cm. ad apicem ramorum rosulatim 5–6 horizontaliter expansa; lamina crasse coriacea rigida oblongo-ovalis vel obovalis vel ovalis ad 12 cm. longa 5 cm. lata nunc in formis parvis circ. 4 cm. longa 2 cm. lata, apice rostrata mucrone rubro terminata ibique subrevoluta, margine firma cartilaginea plana vel paullo recurva, basi late rotundata vel late obtusa; supra plerumque laete viridis interdum purpurascens glabra (in juventute utrinque dense sebaceo-floccosa et rubro-glandulosa), costa media sulcata erubescente, venis primariis paullo conspicuis utrinsecus ad 14; subtus flavido-viridis nunc demum fulva venularum ultimarum reticulo maculis albidis conspicuis glandularum vestigiis ubique notato, costa media elevata, venis primariis fere occultis; petiolus ad 4 cm. longus glauco-purpureus ut rami annotini glaber. Gemmae florales globosae 1.5 cm. diam. extus glutinosae. Flores in umbellas terminales plurifloras (9) dispositi; pedicelli validi circ. 2.5 cm. longi plus minusve breviter glandulosi sub calyce incrassati. Calyx parvus vix 1.5 mm. longus glandulis breviter stipitatis vestitus; cupulae margo undulatus vix 7-lobatus glanduloso-ciliatus. Corolla pallide rosea sparsim kermesino-maculata cupulari-campanulata circ. 3.5 cm. longa glabra tenuis 7-lobata; lobi imbricati rotundati integri vel nunc paullo retusi 1.5 cm. longi 2 cm. lati. Stamina 14 inaequalia, longiora ad 2.8 cm. longa breviora 2 cm.; filamenta glabra. Discus glaber. Gynaeceum circ. 3.5 cm. longum corollam aequans; ovarium conoideum sulcatum truncatum ad juga glandulis rubris fere sessilibus vestitum; stylus glandulis rubris breviter stipitatis a basi ad apicem indutus; stigma lobulatum haud discoideum. Capsula paullo curvata plerumque circ. 2 cm. longa 1 cm. diam. sed nunc 4 cm. longa, nunc 1.5 cm. longa 5 mm. diam. ab apice 5-valvatim dehiscens lateribus valvarum albidis. Semina pallide brunnea complanata late alato-arillata circ. 4 mm. longa 1–1.5 mm. lata, chalaza longe acuminato-prolongata, micropyla rosulato-fimbriata. Species Seriei Fortunei.

Western N.W. Yunnan. Mekong-Salween divide. Alt. 10,000 ft. Lat. 28° 12′ N. Shrub of 4–6 ft. Flowers pale rose-pink with a few crimson markings. In open thickets. Forrest No. **14,151.** July 1917. [All the specimens under this number save only a small check sample sent by a different route were sunk in a steamer torpedoed by the Germans.]

Yunnan. Without precise locality. Forrest No. **15,428.** [All the specimens of this save a small twig in leaf sent by another route were sunk in a steamer torpedoed by the Germans.]

Yunnan. Without precise locality. In fruit. Forrest No. **16,139.** Nov. 1917.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. In open pine forests and on the margins thereof. Shrub of 4–6 ft. In fruit. Forrest No. **19,007.** Oct. 1919.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. On open bouldery meadows. Shrub of 4 ft. In fruit. Forrest No. **19,016.** Oct. 1919; also in openings on the margins of pine forests. Shrub of 6–9 ft. In fruit. Forrest No. **19,178.** Oct. 1919; also, Shrub of 12–16 ft. In fruit. Forrest No. **19,193.** Oct. 1919.

German blackguardism has deprived us of all the flowering material of the species save one small twig with three flowers upon which I have rested for identification with the abundant fruiting material we have had later from Forrest. These fruiting specimens have supplied ample seed from which I hope we shall have a good braird of seedlings. They further—by showing conspicuously the style glandular to the top upon a glandular ovary—suggested affinity with the Thomsoni Series and in the Series of Souliei. The seeds are however those rather of the Fortunei Series and then there is the heptamery in the flower which is unknown in the Thomsoni Series except in *Rh. rotundifolium*—a species which I think should be removed from it, its only relation to the Thomsoni Series being the orbicular leaf; the flower characters too are distant and perhaps it is one of the Fortunei Series also.

3861 **Rhododendron artosquameum,** Balf. f. et Forrest.

Frutex ad 1.5 m. altus tortuose ramosus. Ramuli breves tenues purpurascentes annotini circ. 1.5 cm. longi nitidi epilosi squamis peltatis rubiginosis paucissimis conspersi, mox nigricantes et decorticantes. Folia petiolata ad 3.5 cm. longa; lamina coriacea rigida elliptica vel ovalis circ. 3 cm. longa 2.5 cm. lata, apice rotundata nunc subtruncata vel retusa mucrone saepe depresso terminata, margine flavido-cartilaginea paullo recurva et undulata, basi cordulata; supra opaca nigro-olivacea granulosa elepidota epilosa, costa media erubescente vix sulcata, venis primariis utrinsecus 8–10 paullo elevatis pinnatim patentibus; subtus subfulva dense discontigue lepidota (squamis in foliis juvenilibus fere contiguis) intervallis viridibus diametrum squamarum aequantibus, squamis peziziformibus uniformibus impressis nitidis rubiginosis umbone lato concavo resinoso-punctulato institaque angustissime membranacea albida, costa media elevata albido-flavida glaberrima, venis primariis subimpressis; petiolus circ. 5 mm. longus sulcatus ut ramuli vestitus. Flores in umbellas 4–5-

floras terminales dispositi; bracteae mox deciduae; bracteolae membranaceae lineari-clavatae circ. 6 mm. longae superne vix 1 mm. latae sparsim pilosae dorso copiose lepidotae; pedicelli fragiles circ. 1 cm. longi sub flore expansi ibique glauco-purpurei et sparsim lepidoti deorsum nudi vel fere nudi. Calyx cupuliformis minutus circ. 1.5 mm. longus; cupula squamis sigilliformibus plus minusve induta; limbus sublobatus membranaceus cupulam aequans margine squamis dense cinctus. Corolla basi infundibuliformis sursum ampliatim expansa zygomorpha circ. 2.7 cm. longa rosea emaculata 5-loba extus nuda intus puberula; lobi rotundati paullo emarginati circ. 7 mm. longi 1-4 cm. lati. Stamina 8 inaequalia corolla breviora; filamenta tenuia basim versus minute puberula nunc glabra. Discus glaber. Gynaeceum 3.3 cm. longum corollam excedens; ovarium conoideum truncatum 2.5 mm. longum dense lepidotum; stylus glaber sub stigmate kermesino expansus et labium fingens. Species Seriei Triflori.

S.E. Tibet. Tsarong. Ka-gwr-pw. Alt. 12,000 ft. Forrest **14,535.** July 1917.

Very distinct of that phylum in the Triflorum Series which is next to *Rh. rigidum*, Franch. with close-set scales on the underleaf surface. It may be put in the phylum of *Rh. rigidum* if we extend that which is a distant-scaled type to forms like this. But then the flowers here are different notably they lose their bract-scales early. This plant hinges on to the forms leading to *Rh. stereophyllum*, Balf. f. et W. W. Sm. but there again the flowers are different. Note this also runs into the forms with impressed underleaf scales like *Rh. cardiocides*, *Rh. depile* and the like—and thence to *Rh. oreotrephes* and its phylum with its raised scales. In its phylum characters marking it are: small rigid leaves cordate at base rounded at top elepidote epilose above, densely lepidote below, the scales with curious resin-punctulation on the umbo, midrib below without scales. Calyx scale-fringed and corolla puberulous inside. 8 stamens—have not seen a flower with 10.

Rhododendron asteium, Balf. f. et Forrest.

Fruticulus circ. .5 m. altus. Rami tenues stricti annotini circ. 2 mm. diam. vestigiis indumenti juvenilis pilosi sparsim praediti. Folia breviter petiolata ad 5 cm. longa; lamina chartacea oblonga vel anguste obovalis ad 4.5 cm. longa 1.6 cm. lata, apice rotundata apiculato-mucronata, margine cartilaginea plana, basi late obtusa; supra atro-viridis purpurascens opaca glabra (juventute plus minusve floccosa) costa media sulcata, venis primariis utrinsecus 8-10 impressis; subtus viridi-brunnea indumento tenui subarachnoideo vestita, costa media elevata

erubescente sparsissime floccosa; petiolus vix 5 mm. longus ut rami vestitus. Umbellae plerumque 4-florae; pedicelli fragiles ad 1.5 cm. longi laxe setulosi eglandulosi. Calyx magnus ad 1 cm. longus; cupula minuta vix 1 mm. longa setulosa; lobi 5 membranacei inaequales plus minusve cohaerentes glabri eciliati flavi vel roseo-tincti demum deflexi collare persistens sub corolla construentes. Corolla rosea circ. 3 cm. longa aperte campanulata basi paullo gibbosa; lobi 1 cm. longi 1.7 cm. lati emarginati intensius roseati. Stamina 10 circum stylum aggregata subaequalia circ. 2 cm. longa; filamenta basi puberula; antherae intense purpureae. Discus sub ovario puberulus. Gynaeceum circ. 2.5 cm. longum; ovarium petasiforme truncatum sulcatum circ. 4 mm. longum eglandulosum setulis pilisque fasciatis erubescentibus tomentosum; stylus validus glaber sursum subampliatus; stigma lobulatum discoideum. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. On open cliffs. Shrub of 1½–2 ft. Flowers rose-margined and lined a deeper shade. Forrest No. **18,937.** July 1919.

One of the species with rose-coloured flowers of the Sanguineum Series. Perhaps its nearest ally is *Rh. cudoxum*, Balf. f. et Forrest but that species has glandular young stems and pedicels and ovary also with glands; its calyx much smaller not forming the big collar and then the leaves are essentially obovate and really green below owing to the very detersile indumentum.

Rhododendron brachystylum, Balf. f. et Ward.

Frutex laxe patens vel erectus ad 2.5 m. altus. Rami tenues annotini vix 2 mm. diam. pilis longis lanatis laxe induti sparsim lepidoti, vetustiores cinerei epilosi. Folia petiolata ad 4 cm. longa plerumque breviora floribus coaetanea plus minusve decidua; lamina papyracea obovato-oblonga ad 3.6 cm. longa 2 cm. lata, apice rotundata minute stipitato-mucronulata, margine leviter revoluta, basi cuneata; supra pallide viridis opaca squamulis albidis parvis inaequalibus discontiguis lepidota et pilis albidis contortis plus minusve hirsuta plus minusve glabrescens, costa media suberubescente, venis caeteris occultis; subtus albido-viridis papillis epidermicis ceriferis tecta squamis inaequalibus scintillantibus flavidis discontiguis (in quoque quad. mm. circ. 8) vestita, costa media prominula lepidota et plus minusve pilosa, venis primariis utrinsecus ad 8 erubescentibus leviter prominulis et plus minusve pilosis; petiolus circ. 4 mm. longus ut rami vestitus. Umbellae terminales 4-florae; bracteae crustaceae ad basim pedicellorum sub anthesi saepe persistentes exteriores rotundatae intimae late oblongo-obovatae omnes brev-

iter ciliatae extus lepidotae; bracteolae lineari-clavatae lepidotae et pilo-cristatae; pedicelli stricti erecti ad 3 cm. longi purpurei lepidoti et plus minusve setulosi demum subglabri superne ampliati. Flos saepe secundus. Calyx parvus ad 4 mm. longus fere ad basim 5-partitus; cupula purpurea sigillatim lepidota; lobi flavidi submembranacei oblongi obtusi circ. 3 mm longi extus lepidoti margine plus minusve setuloso-ciliati, nunc decidui. Corolla subcarnosula aurea postice maculata irregularis subinfundibuliformis ad 1.7 cm. longa 5-loba extus dense lepidota intus puberula; lobi inaequales (posterior minimus), antero-laterales circ. 1 cm. longi 8 mm. lati, postero-laterales rotundati 1 cm. diam. Stamina 10 inaequalia corolla breviora, posteriora minima circ. 9 mm. longa et supra basim glabram dense villosa, anteriora longiora circ. 1.2 cm. longa supra basim glabram sparsim puberula. Discus glaber. Gynaeceum ad 1.2 cm. longum staminibus paullo brevius; ovarium circ. 3 mm. longum sulcatum truncatum dense lepidotum; stylus crassus brevis deflexus glaber sub stigmate lobulato grosse incrassatus. Capsula cylindrica ad 1 cm. longa 4 mm. lata squamis verruculosa (sub fructu calyce deciduo), ab apice ad basim 5-valvata; semina minuta fusiformia vix 1 mm. longa flavida extremitate chalazali conoidea brevi funiculari haud cristata. Species Seriei Trichocladi.

N.E. Burma: Western buttress of Imaw Bum. Alt. 10,000 ft. Slender bush of six or eight feet growing on steep rocky moss-covered slopes amongst bamboos and various shrubs. Flowers bright lemon yellow with a few yellowish green spots. Not common nor pretty. 27.5.19.

3.9.19. A common bush amongst the boulder screes and cliffs below the main ridge on the eastern face of Imaw Bum. 12,000 ft. Generally an ascending shrub of 4-6 ft. growing on the steep slopes, it is rarely erect, but on the summit of the ridge where it is also found it is an erect bush. Also found on rocky bank overhanging Chaung-maw-Lka. 9-10,000 ft. F. Kingdon Ward. No. **3097.**

S.E. Tibet: Tsarong, Salween—Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. On open stony slopes and alpine meadows. Shrub of 2–2½ ft. In fruit. Forrest No. **19,194.** October 1919.

N.E. Burma: Chawchi Pass. Alt. 12–13,000 ft. On open slopes rocks and cliffs sometimes amongst scrub and bamboo. A straggly bush of 1–3 ft. with flowers, though, contemporaneous with the leaves, clear yellow. Farrer **1717.** July 14, 1920.

Evidently a species of the Trichocladum Series with wide local distribution. It is from Ward's account one of the largest in the Series but not attractive and it is a large-leaved plant. The

foliage and flowers are coaetaneous and the leaves appear to be deciduous at the end of the season and the hairy covering is composed of curling woolly hairs. The membranous calyx-lobes are deciduous often early and vary in degree of their setulose-ciliation. It is quite a distinct plant in the Series.

Rhododendron caloxanthum, Balf. f. et Farrer.

Frutex circ. 1 m. altus paucifolius. Rami annotini circ. 2 mm. diam. rubro-glandulosi glandulis breviter stipitatis, vetustiores albidi. Alabastra ovoidea ; perulae extimae longe caudatae dense rubro-glandulosae. Folia longe petiolata ad 10 cm. longa pauca in rosulis ad apicem ramulorum disposita ; lamina coriacea elliptica vel suborbicularis ad 6.5 cm. longa 5 cm. lata, mucrone paullo rostrato terminata, basi cordulata ; supra olivacea vel atro-violacea vel purpureo-brunnea glabra, costa media angusta paullo sulcata erubescente, venis primariis utrinsecus ad 10 paullo sulcatis ; subtus primo pallide viridis demum cervina glandulis rubris punctulata et pilis sebaceis aurantiacis numerosis praedita, costa media paullo elevata ; petiolus 2.5 cm. vel ultra longus plus minusve stipitato-glandulosus. Umbella 4–6-flora ; pili in axillis bractearum coccinei ; bracteolae filiformes circ. 6 mm. longae basi glabrae sursum pilosae et glandulosae ; pedicelli circ. 1.5 cm. longi dense stipitato-glandulosi sub calyce inerassati. Calyx parvus carnosulus atro-kermesinus dense glandulosus circ. 5 mm. longus 5-dentatus ; lobi cupulam aequantes. Corolla citrina a basi campanulata circ. 3 cm. longa glabra ; lobi 5 breves et lati circ. 8 mm. longi 2 cm. lati. Stamina 10 inaequalia, longiora corollam subaequantia, breviora circ. 2 cm. longa ; filamenta glabra. Discus glaber. Gynaeceum corollam staminaque subaequans ; ovarium tenue circ. 5 mm. longum sulcatum truncatum glandulis plurimis stipitatis vestitum ; stylus fere ad medium glandulosus ; stigma lobulatum stylo paullo latius.

N.E. Upper Burma. Chimili (and Hpimaw). Alt. 11–12,000 ft. A little bush of four feet. Buds vermilion as they open flushed with apricot and tipped with orange-scarlet. Fully developed flowers of clear citron yellow very attractive. High alpine scrub along the edges of both Hpimaw and Chimili Passes, just coming into bloom on May 18. Farrer No. **937.** May 18, 1919.

N.E. Upper Burma. Chawchi Pass, etc. Alt. 12,000 ft. Probably = Farrer 937. Campylocarpum Series. Here it is even more abundant and a smaller bush, more free-flowering, covering the open slopes and precipice-ledges in dense masses of 2–3 ft. jungle. Covered with dense masses of pale sulphur-yellow blossom in exactly the same tone as the here prevalent form of *Rh. eclecteum*, a thousand feet lower. Farrer No. **1672.** July 2, 1920.

Mr Farrer rightly recognised the relationship of this Burmese plant to *Rh. campylocarpum* of the Himalayas, and the alliance is really very close. It seems to be an altogether smaller plant but like so many of these really representative species it offers barely strong characters for diagnosis. Points to note are its sticky buds, elliptic to suborbicular leaves, the persistent red hairs in the axils of bracts, calyx fleshy glandular, corolla yellow 3 cm. long, style glandular at base. The plant to which Mr Farrer refers in the field-ticket attached to No. 1672 as *Rh. eclecteum* is *Rh. aiolosalpinx*.

Rhododendron cardioeides, Balf. f. et Forrest.

Frutex ad 2 m. altus. Ramuli virgati stricti erubescentes subglauci epilosi sparsim lepidoti annotini ad 2 mm. diam. Folia petiolata ad 5.5 cm. longa; lamina subcoriacea elliptica ad 4.5 cm. longa 3.5 cm. lata apice obtusa mucrone parvo tuberculato terminata, margine plana angustissime cartilaginea, basi cordata sinu aperto; supra olivacea glabra subnitida elepidota plerumque epilosa, costa media rubra haud sulcata, venis primariis utrinsecus ad 12 paullo elevatis patulim patentibus; subtus pallide fulvida (junior glauca) dense discontigue lepidota intervallis subglaucis diametrum squamarum excedentibus, squamis in quoque quad. mm. circ. 5 6 rubiginosis subscintillantibus resinoso-infiltratis umbone plano et instita integra pallida angustissima, costa media flavida basim versus erubescente glabra, venis primariis occultis; petiolus ruber ad 1 cm. longus ut ramuli vestitus. Flores in umbellas 4-floras terminales dispositi; bracteae mox deciduae; bracteolae circ. 1 cm. longae lineares sursum angustatae a basi pilosae superne lepidotae apice pilocristatae; pedicelli stricti ad 1.5 cm. longi glauco-purpurei sparsim lepidoti ad apicem oblique expansi. Calyx cupuliformis minutus circ. 1 mm. longus; cupula extus lepidota margine undulata vel lobis 5 semilunatis squamo-cinctis notata. Corolla infundibuliformi-campanulata circ. 3 cm. longa laete rosea sparsim maculata extus glabra; tubus latus intus puberulus in limbum latum ampliatus; lobi rotundati emarginati circ. 1.5 cm. diam. Stamina 10 inaequalia longiora corolla paullo breviora; filamenta deorsum paullo dilatata basim versus dense puberula. Discus puberulus. Gynaeceum ad 3.5 cm. longum corollam superans; ovarium conoideum sulcatum truncatum dense lepidotum circ. 4 mm. longum; stylus roseus glaber sub stigmate kermesino lobulato expansus. Species Seriei Triflori, phyli *Rh. oreotrephis*.

N.W. Yunnan. Kari Pass. 11,000 ft. Forrest **13,931.** June 1917.

Note the very constantly cordate leaves.

Rhododendron cerinum, Balf. f. et Forrest.

Frutex pauci-ramosus. Rami purpurei annotini circ. 2 mm. diam. sparsim lepidoti plus minusve setulosi, deinde cinerei squamarum vestigiis punctulati. Folia petiolata ad 6.5 cm. longa; lamina coriacea oblongo-ovalis vel obovalis circ. 5.5 cm. longa 2.75 cm. lata, apice obtusa mucrone tuberculato terminata, margine paullo recurva obscure undulata, basi subcuneata; supra opaca olivacea squamis albidis (umbone nigricante) siccis discontiguis pruinosa, costa media sulcata plus minusve puberula, venis primariis utrinsecus ad 12 paullo prominulis; subtus papillis epidermicis tecta fulvida in juventute subgrisea squamis plurimis brunneis discontiguis (in quoque mm. quadr. circ. 12) dense vestita, costa media elevata sparsim lepidota, venis caeteris occultis; petiolus ad 1 cm. longus dense lepidotus. Flores in umbellas terminales circ. 6-floras dispositi; bracteae mox deciduae; bracteolae lineares a basi pilosae albo-cristatae; pedicelli circ. 1.2 cm. longi purpurei validi infra sparsim supra dense lepidoti nunc setas paucas gerentes sub calyce expansi. Calyx apertus corollae basim cingens circ. 4 mm. longus ultra medium 5-fissus; lobi elliptici circ. 3 mm. lati extus lepidoti. Corolla cerina postice maculata subcampanulata circ. 2 cm. longa subcarnosula basi plus minusve gibbosa extus lepidota intus glabra 5-loba; lobi rotundati integri circ. 9 mm. longi 1.2 cm. lati. Stamina 10, 5 antipetala breviora circ. 1.1 cm. longa, 5 interpetalina longiora circ. 1.5 cm.; filamenta puberula. Discus puberulus. Gynaeceum corolla staminibusque brevius, circ. 1 cm. longum; ovarium petasiforme sulcatum lepidotum circ. 3 mm. longum; stylus paullo declinatus basi breviter lepidotus sub stigmate lato lobulato ampliatus. Species *Rh. sulfureo, Franch.* affinis.

Western Yunnan. Shweli-Salween divide. Forrest No. **17,592.** June 1918.

N.E. Upper Burma. Chawchi Pass. Alt. 10,500 ft. As before usually epiphytic in masses of moss on old Abies in the high alpine zone. Abundant at 10,500 ft. Farrer No. **1550.** May 15, 1920.

A species of the phylum of *Rh. Boothii* with esetulose stems, oblong obtuse leaves, shorter pedicels their scales not shining as are none of those on the flower, calyces without bristles, slightly reflexed style lepidote at base.

Rhododendron chalarocladum, Balf. f. et Forrest.

Frutex laxe ramosus. Rami tenues stricti nodulosi ultimi circ. 2 mm. diam. glandulosi pilis sebaceis aurantiacis et glandulis sparsis induti. Folia ad apicem ramulorum in rosulas

4–5-foliatas aggregata longe petiolata ad 11 cm. longa; lamina chartacea oblonga vel elongato-ovalis utrinque subrotundata ad 8 cm. longa 4 cm. lata apiculato-mucronata, margine plana, basi nec cordulata nec trunculata; supra opaca atro-olivacea glabra; subtus pallide viridis pilis sebaceis tenuibus ramosis aurantiacis ubique vestita, costa media elevata straminea; petiolus ad 3 cm. longus ut rami vestitus. Umbella 2–3-flora; pedicelli circ. 2 cm. longi intense rubri glandulis rubris et floccis sebaceis plus minusve vestiti. Calyx parvus circ. 2.5 mm. longus carnosulus dense rubro-glandulosus; lobi rotundati inaequales, postici majores circ. 1 mm. longi. Corolla infundibuliformi-campanulata circ. 3.5 cm. longa alba? sparsim maculata et varo basali kermesino notata; lobi lati emarginati circ. 1.2 cm. longi 1.6 cm. lati. Stamina 10 inaequalia corolla multo breviora, longiora circ. 2.5 cm. longa, breviora vix 2 cm.; filamenta puberula. Discus puberulus. Gynaeceum corollam aequans vel paullo superans; ovarium elongatum circ. 6 mm. longum tenue conoideum truncatum glandulis subsetulosis dense vestitum; stylus glaber in stigma haud latius ampliatus.

S.E. Tibet. Tsarong. G. Forrest No. **18,646.** 1917.

A distinct species of the oblong-leaved set of the Selense Series quite unlike any other and marked by its loose habit, long-petioled oblong leaves, few flowers in the umbel each supported on a bright-red sparingly glandular and sebaceous pedicel about 2 cm. long, small irregular calyx, corolla probably white and with a red blotch, puberulous stamens and setulose glandular ovary with glabrous style.

474 **Rhododendron chamaezelum,** Balf. f. et Forrest.

Frutex lignosus parvifolius ad 2 dm. altus copiose intricato-ramosus. Rami annotini circ. 1.25 mm. diam. furfuracei rufo-squamosi. Folia breviter petiolata ad 1.2 cm. longa; lamina coriacea ovalis vel oblongo-ovalis utrinque subattenuata ad 1 cm. longa vix 5 mm. lata, apice obtusa, margine recurva, basi cuneatim obtusa; supra olivacea opaca squamis peltatis contiguis subimbricatis aureo-tincta, costa media sulcata basi solum conspicua; subtus rubiginosa (costa media vix elevata) ubique lepidota squamis latis primo bicoloratis (brunneis et albo-viridibus) aequaliter intermixtis demum saepe concoloribus; petiolus ad 2 mm. longus ut rami juveniles vestitus. Flores in umbellas compactas terminales 2–3-floras dispositi. Calyx circ. 2 mm. longus 5-partitus; lobi inaequales virides extus lepidoti margine ciliati. Corolla aperta ad 1.2 cm. longa; tubus extus intusque puberulus; lobi extus lepidoti. Stamina 10 corollam subaequantia; filamenta villosa. Discus puberulus. Gynaeceum corolla longius; ovarium dense lepidotum breve circ. 1.2 mm.

longum ; stylus basi puberulus. Species Seriei Lapponici, *Rh. muliensi*, Balf. f. et Forrest affinis.

Western N.W. Yunnan. Mekong-Salween divide. 12,000 ft. Forrest **14,074.** June 1917.

A fine yellow-flowered species.

Rhododendron charidotes, Balf. f. et Farrer.

Suffruticosus prostratus ubique setulosus tenuiramosus. Rami perulati, juveniles circ. 1 mm. diam. rufo-setulosi et squamis furfuracei, vetustiores albido-cinerei. Folia parvula petiolata ad 1.5 cm. longa ; lamina coriacea oblongo-ovalis nunc obovalis ad 1.2 cm. longa 8 mm. lata, apice obtusa longe stipitato-mucronata, margine paullo recurva setulosa, basi obtusa ; supra laete viridis squamis albidis plus minusve pruinosa setulosa ; subtus pallide ferruginea (in juventute flavido-viridis) squamarum imbricatarum indumento compacto obtecta (squamis paucis majoribus intensius coloratis uniformiter conspersa) et plus minusve setulosa, costa media straminea setulosa et sparsim lepidota, venis caeteris occultis ; petiolus circ. 3 mm. longus ut rami plus minusve vestitus. Flores solitarii terminales rarius bini ; bracteae sub anthesi persistentes basim pedicellorum cingentes tenues interiores subrotundatae ad 5 mm. longae truncatae minute ciliatae ; pedicelli ad 2 cm. longi purpurei sparsim lepidoti setulosi. Calyx 5-partitus viridis et rubro-tinctus circ. 6 mm. longus ; lobi ovati obtusi extus dense lepidoti puberuli et setulosi, setuloso-ciliati. Corolla roseo-kermesina maculata subrotata aperta circ. 2 cm. longa ; tubus circ. 3 mm. longus intus pubescens ; limbus 5-lobatus extus dense lepidotus et puberulus ; lobi rotundati circ. 1.4 mm. diam. Stamina 10 alternatim inaequalia, longiora circ. 1.2 cm. longa antheris 3 mm. longis, breviora circ. 9 mm. longa antheris 2.5 mm. ; filamenta supra basim floccosim puberula. Discus glaber. Gynaeceum corolla brevius circ. 1.5 cm. longum ; ovarium circ. 3 mm. longum conoideum sulcatum dense lepidotum et setulosum ; stylus rectus basi setis paucis praeditus sub stigmate discoideo lobulato vix incrassatus. Species Seriei Saluenensis.

"N.E. Burma : Chawchi Pass. Alt. 10,000 ft. This precisely echoes Farrer 1045 [*Rh. calostrotum*] in every way even to habit and habitat, but seems a quite distinct species with hairier narrower foliage and great magenta-crimson flowers usually solitary. This range seems, in fact, to repeat Farrer 1045, Farrer 1046 [*Rh. myrtilloides*] in two species, extraordinarily similar, yet distinct. Whereas Farrer 1046 and Farrer 1045 have twin flowers, for instance, Farrer 1690 and Farrer 1670 [*Rh. charopoeum*] are 1-blossomed [No ; both these run as frequently to pairs, July 22]. Cf. also 1683 [*Rh. chaetomallum*]. Farrer No. **1690.** July 3, 1920."

This charming species is allied to *Rh. radicans*, Balf. f. et Forrest and *Rh. keleticum*, Balf. f. et Forrest. It is however quite singular in the phylum through the intensity of its bristliness. Stems, leaves, pedicels, calyx, ovary are all bristly. There is no other species of the series in which the bristles are so widely spread.

Rhododendron charitopes, Balf. f. et Farrer.

Frutex laxus ad 3 dm. altus. Rami perulati, annotini stricti ad 2 mm. diam. squamis flavidis dense furfuracei. Folia petiolata ad 4.5 cm. longa; lamina coriacea obovata ad 4 cm. longa 2.5 cm. lata, apice rotundata stipitatim mucronata, margine leviter recurva subundulata, basi in petiolum attenuata; supra purpurata subnitida glabra sed squamarum vestigiis nigricantibus induta et costa media plus minusve puberula; subtus venulosa griseo-albida papillis epidermicis ceriferis tecta, squamis flavidis inaequalibus scintillantibus discontiguis (in quoque quad. mm. circ. 6–7) vestita et paucis majoribus demum brunneis irregulariter punctulata, costa media elevata sparsim lepidota, venis primariis utrinsecus ad 8 prominulis; petiolus ad 5 mm. longus ut rami vestitus. Floriferus. Umbellae 3-florae (rarissime 4-); bracteae crustaceae sub anthesi persistentes apiculatae plus minusve furfuraceae; bracteolae circ. 6 mm. longae lineares pilo-cristatae; pedicelli ad 2.5 cm. longi stricti erecti purpurei squamis magnis dense lepidoti. Flos erectus. Calyx subfoliaceus fere 1 cm. longus profunde 5-partitus; tubus cupularis; lobi 5 brunnei viridi-tincti oblongo-ovales extus margineque flavido-lepidoti. Corolla campaniformis pallide roseo-alba postice roseo-maculata ad 2.5 cm. longa; tubus extus glaber intus puberulus; lobi 5 circ. 1 cm. longi 1.5 cm. lati bilobulati subrecurvi. Stamina 10 subaequalia circum stylum aggregata tubum corollae vix superantia; filamenta tenuia basi glabra supra fere ad apicem puberula. Discus vix puberulus. Gynaeceum stamina aequans circ. 1.5 cm. longum; ovarium subcylindricum leviter sulcatum truncatum ad 6 mm. longum; stylus crassus claviformis fere rectus haud declinatus; stigma lobulatum. Species Seriei Campylogyni, phyli *Rh. brachyanthi.*

"N.E. Upper Burma. Shing Hong Pass. Alt. 10,500–12,000 ft. Farrer No. **1627.** June 18, 1920. A particularly charming plant with the last [which?], but a loose bush of 9 inches to a foot, very copious with 3- (very rarely 4-) bloomed inflorescences. Flowers of a clear apple-blossom pink, but flushed more warmly in their upper lobe and speckled with crimson, and with a deep-rose tube. Two specimens of pure albinos in the Chawchi Pass and a natural hybrid with Farrer No. 1670 [*Rh. charopoeum*]. See Farrer No. 1726."

The alliance of this species is with *Rh. hypolepidotum*, Balf. f. et Forrest, a Mekong-Salween species recognisable at sight by the absence of the grey-white underleaf coloration which is prominent in *Rh. charitopes*.

Rhododendron charitostreptum, Balf. f. et Ward.

Suffrutex aromaticus nanus rupicola dense aggregatus. Rami perulati, annotini circ. 2 mm. diam. squamis furfuracei. Folia petiolata ad 5.5 cm. longa; lamina coriacea obovalis ad 4.8 cm. longa 2.5 cm. lata, apice rotundata nunc retusa mucrone tuberculato terminata, margine subcartilaginea vix recurva obscure undulata, basi attenuata; supra subnitida purpureo-brunnea squamis marcidis adpressis sigilliformibus plus minusve induta, costa media sulcata erubescente glabra, venis primariis subobcultis; subtus griseo-alba papillis epidermicis ceriferis tecta granulosim punctulatimque lepidota, squamis magnis distantibus nigris paucis, squamis parvis et squamis intermediis disconti-guis (in quoque mm. quadr. circ. 12) subaequaliter intermixtis flavido-albidis, costa media erubescente elevata sparsim lepidota, venis primariis pinnatim prominulis utrinsecus 8–10; petiolus ad 7 mm. longus ut rami vestitus. Umbellae terminales brevissime racemosae ad 5-florae, rhachi grosse lepidota; bracteae et bracteolae mox deciduae; pedicelli tenues erecti ad 2 cm. longi dense verruculosim lepidoti et squamis stipitatis vestiti sub calyce incrassati et densius lepidoti. Calyx conspicuus ad 6.5 mm. longus 5-partitus; lobi subcoriacei ovati vel late ovati obtusi vel subacuti extus dense lepidoti circ. 5 mm. longi 4 mm. lati. Corolla parva citrina emaculata subrotata ad 1.3 cm. longa extus lepidota; tubus latus basi circ. 3 mm. diam. 5 mm. longus intus puberulus; limbus patens parte basali integra circ. 3 mm. longa intus subvillosa; lobi 5 saepe reflexi rotundati integri circ. 5 mm. longi 7 mm. lati. Stamina 10 inaequalia corollam vix aequantia; longiora circ. 1.2 mm. longa filamentis tenuibus basi glabris et sursum intra tubum corollinum puberulis, breviora circ. 8 mm. longa supra basim glabram ex toto puberula. Discus glaber? Gynaeceum staminibus brevius, vix 1 cm. longum; ovarium conoideum truncatum sulcatum lepidotum circ. 3 mm. longum; stylus crassus glaber clavatus circ. 7 mm. longus paullo deflexus; stigma latum lobulatum. Species Seriei Campylogyni, phyli *Rh. brachyanthi*.

"N.E. Upper Burma. Imaw Bum. Alt. 11–12,000 ft. Bluffs and precipices. Rhododendron of a type not previously seen anywhere. Dwarf growing in compact masses on and amongst the granite rocks on S.-facing slopes. Very common. Thickets a foot deep. Flowers lovely lemon-yellow with red

stamens. In full bloom. Calyx green dusted with scaly meal. One of the prettiest dwarf Rhododendrons met with colouring the bare rocks. Leaves aromatic, flowers slightly fragrant. Kingdon Ward No. **3302.** 2.7.19.

A good many plants still in bloom. This with Nos. 3290, 3301 [*Rh. aperantum*], 3365, 3610 and dwarf salix forms the bulk of the carpet covering the granite rocks of Imaw. Kingdon Ward. 23.7.19.

Bees visiting the flowers though it was raining steadily. Kingdon Ward. 25.7.19."

This plant found by Ward is in vegetative characters very like the Burmese *Rh. charitopes,* Balf. f. et Farrer discovered by Farrer. Both of them belong to the phylum of *Rh. brachyanthum,* Franch. within the Campylogynum Series. Looking at leaves and stems in the dried specimens I have not found diagnostic characters. But when we come to the flower there is abundant specific difference within the bounds of the phylum. I will only indicate here that *Rh. charitostreptum* has unspotted yellow flowers, the corolla short subrotate lepidote outside villous in the throat and with short entire lobes in contrast with the spotted white suffused pink flowers (apple blossom) of *Rh. charitopes* in which the corolla is campaniform nearly half again as long glabrous outside and with broad two-lobed segments. There are other points of difference. The two species are quite distinct, but certainly the vegetative resemblance is remarkable.

Rhododendron charopoeum, Balf. f. et Farrer.

Suffrutex nanus circ. 2 dm. altus late patens. Rami perulati duri radicantes, annotini circ. 1.5 mm. diam. sparsim lepidoti. Folia breviter petiolata ad 2.3 cm. longa ad apicem ramulorum rosulatim aggregata; lamina crasse coriacea obovata ad 2.1 cm. longa 9 mm. lata, apice rotundata subretusa in sinu mucrone terminata, margine minute crenulata in crena quaque squamam peltatam gerens; basi in petiolum gradatim attenuata; supra olivacea opaca glabra sed squamarum juvenilium vestigiis notata, costa media glabra erubescente, venis primariis occultis; subtus griseo-albida papillis epidermicis ceriferis tecta superficie elepidota, costa media elevata et sparsim lepidota, venis primariis subtiliter prominulis utrinsecus 6–7 glabris sed nunc squamas solitarias gerentibus; petiolus 1–2 mm. longus erubescens glaber. Flores solitarii terminales; bracteae crustaceae ad basim pedicellorum sub anthesi persistentes, exteriores elongato-triangulares acuminatae carinatae, interiores ovato-acuminatae; pedicelli validi purpurei sparsim lepidoti ultra folia longe exserti. Flos secundus. Calyx parvus vix 1.5 mm. longus 5-lobus; lobi triangulares glabri. Corolla campaniformis subcarnosula circ. 2.3

cm. longa roseo-purpurea cerifera et glauca; tubus extus glaber intus puberulus basi 5-gibbosus; lobi 5 rotundati circ. 1 cm. diam. integri erecti imbricati. Stamina 10 corolla breviora, 5 longiora circ. 1.5 cm. longa, 5 breviora circ. 1 cm. longa; filamenta carnosula subcomplanata in triente superno glabra caeteroquin breviter puberula. Discus minutissime puberulus. Gynaeceum staminibus longius corollam aequans; ovarium petasiforme sulcatum truncatum circ. 4 mm. longum dense lepidotum; stylus glaber glauco-purpureus validus sursum paullo incrassatus rectus; stigma lobulatum. Species Seriei Campylogyni.

"N.E. Burma. Chawchi Pass. Alt. 11,900 13,000 ft. Farrer No. **1670.** July 2, 1920. Very near Farrer No. 1046 [*Rh. myrtilloides*] but larger in all its parts, with much larger flowers as invariably solitary as those of Farrer No. 1046 are twinned. A low bush of 6 8 inches on the opener places of the alpine slopes. It is a smaller plant than Farrer No. 1046 with bigger leaves and flowers. It abounds on the open arêtes. For a hybrid see Farrer No. 1726."

The almost elepidote leaves and the very minute glabrous calyx in the large flowers are marks to note.

3879 **Rhododendron chasmanthoides,** Balf. f. et Forrest.

Rh. Augustinii, Hemsl. var. *grandifolia,* Franch. in Journ. de Bot. xii (1898), 261.

Rh. sidérophyllum, Diels (nec Franch.) in Notes R.B.G. Edin. vii (1913), 51.

Frutex ad 8 m. altus. Ramuli tenues crassi, annotini circ. 2 mm. diam. brevissime puberuli sparsim lepidoti. Folia petiolata ad 11 cm. longa; lamina chartacea oblongo-ovalis ad 10 cm. longa 4 cm. lata, obtusa nunc apicem versus paullo attenuata neque acuminata mucrone rubescente tuberculato terminata, margine albo-cartilaginea, basi rotundata nunc late obtusa; supra laete viridis subnitens demum erubescens laevis squamulis albidis vel brunneo-tinctis parvis inconspicuis paucis inter se ad 2 mm. distantibus conspersa, costa media puberula et venis primariis utrinsecus 10–12 haud sulcatis; subtus pallidior nunc subglauca minutissime venulosim reticulata squamis impressis sigilliformibus distantibus (1 cm. vel ultra) lepidota, costa media flavida elevata plus minusve praecipue basim versus tenuiter puberula; petiolus ad 1.3 cm. longus sulcatus ut ramuli vestitus. Flores in umbellas 4–6-floras dispositi; bracteae mox deciduae; bracteolae lineares apicem versus clavatae 1.2 cm. longae albopilosae pilo-cristatae; pedicelli stricti ad 3 cm. longi atropurpurei squamis sigilliformibus albis sparsim conspersi. Calyx late cupuliformis carnosulus circ. 2 mm. longus; cupula extus dense albido-lepidota; limbus brevissimus institam undulatam brun-

neam vix .5 mm. longam minute ciliatam et squamo-cinctam fingens. Corolla subcarnosula roseo-lavandulacea olivaceo-maculata ad 3.5 cm. longa zygomorpha; tubus basi intensius coloratus postice subventricosus extus squamulis parvulis albis basi sparsissime lepidotus intus glaber sursum in limbum amplum expansus; lobi 5 ovales circ. 2 cm. longi 2 cm. lati. Stamina 10 inaequalia corollam subaequantia; filamenta deorsum dilatata supra basim brevem nudam ad faucem corollae puberula; antherae spadiceae. Discus sub ovario dense puberulus. Gynaeceum corollam multo superans; ovarium conoideum truncatum dense lepidotum; stylus glaber sub stigmate lobulato discoideo expansus. Capsula leviter curvata 2 cm. longa 4 mm. diam. brunnea lepidota ab apice 5-valvata. Semina minuta oblonga. Species Seriei Triflori.

Western N.W. Yunnan. Mekong-Salween. Tzeku. Soulié No. **1012.** (*Rh. Augustinii*, Hemsl. var. *grandiflora*, Franch.).

Western N.W. Yunnan. Mekong-Salween divide. W. of Tzeku. Lat. 28° 10′ N. Alt. 10–11,000 ft. Open situations on the margins of mixed forests. Forrest No. **689.** Sept. 1904. (*Rh. siderophyllum,* Diels).

S.E. Tibet. Tsarong. Mekong-Salween divide. Doker-la. Lat. 28° 25′ N. Alt. 10–11,000 ft. In open thickets and pine forests. Shrub of 4–8 ft. Flowers rose-lavender with olive green markings. Forrest No. **16,360.** May 1918.

Yunnan. Without precise locality. In fruit. Forrest No. **17,456.** Oct. 1918; Nos. **17,476**? and **17,479.** Nov. 1918.

S.E. Tibet. Tsarong. Salween–Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. Alt. 8–10,000 ft. Margins of forests and thickets. Shrub of 2–6 ft. Flowers soft lavender deepest at base. Forrest No. **18,903.** July 1919.

Rhododendron chawchiense, Balf. f. et Farrer.

Arbor. Rami crassi annotini circ. 5 mm. diam. indumento albido vel rufo plus minusve persistente pilorum sebaceorum et glandularum parvarum tomentosim vestiti. Folia petiolata ad 17 cm. longa; lamina tenuiter coriacea anguste oblonga vel oblongo-ovalis vel oblongo-lanceolata utrinque attenuata, ad 15.5 cm. longa 3.5 cm. lata, apice acuta nunc rostratim acuta mucrone parvo terminata, margine cartilaginea plana vel paullo recurva, basi cuneata; supra atro-viridis opaca glabra sed indumenti juvenilis vestigiis notata, costa media rubida sulcata, venis primariis utrinsecus circ. 20 paullo impressis; subtus pallidior griseo-viridis laevis, costa media erubescente elevata sparsim floccosa, venis primariis paullo prominulis erubescentibus cum venulis magnitudinis subordinatae albido-floccosis, caeteroquin papillis epidermicis longis baculiformibus ad apicem lobulatis

haud albidis laxe obtecta; petiolus circ. 1.5 cm. longus ut rami vestitus. Racemo-umbella 8–10?-flora, rhachi circ. 1 cm. longa sebaceo-floccosa pilis albidis et rufis vestita (etiam pilis albidis et rufis in axillis bractearum fertilium densissime aggregatis); bracteae exteriores coriaceae tenuiter marginatae rotundatae vel orbiculares dorso sebaceo-pilosae et praesertim apicem versus dense glandulosae, fertiles oblongae vel oblongo-ovales vel obovales 2.7 cm. longae 8 mm. latae apiculatae utrinque sericeae dorso apicem versus glandulosae; bracteolae 1.3 cm. longae lineares a basi pilosae; pedicelli vix 1 cm. longi sparsim sebaceo-floccosi. Calyx glaberrimus minutus circ. 1 mm. longus lobos 7 carnosulos deltoideos persistentes gerens. Corolla kermesina emaculata sed varo basali notata campanulata plus minusve zygomorpha 3.5 cm. longa paullo gibbosa haud septata 7-loba; lobi rotundati circ. 1.5 mm. diam. Stamina 14 inaequalia, longiora circ. 3.5 cm. longa gynaeceum aequantia, breviora 2 cm.; filamenta glabra. Discus ad juga minute puberulus. Gynaeceum 3.5 cm. longum; ovarium 6 mm. longum conoideum sulcatum truncatum glabrum superficie minutissime papillatum; stylus glaber; stigma parvum styli diametro minus. Species Seriei Irrorati.

N.E. Upper Burma. Chawchi Pass, etc. Alt. 10,500 ft. A smaller tree than the last [presumably 1551 which is *Rh. hylaeum*. Balf. f. et Farrer] in full blossom amid the snow. Flowers very copious but of a virulent blue-magenta like *Rh. fastuosum* fl. pl. Though much like this some of its tones are less displeasing than others. Nos. 1549, 1551, 1552 make up the spring flowering Rhododendron forest at 10,500 ft. F. 1552 is particularly abundant and copious just now among the snow at 10,500 ft. Farrer No. **1552**A. May 15, 1920.

Also in miles of colour in the open on the Maguchi Pass, June 1.

The specimens of this species came to this country mixed with those of *Rh. niphobolum,* Balf. f. et Farrer. To which of the specimens Farrer's field ticket 1552 belongs there is no way to find out. I have numbered the plants 1552A and 1552B and have attached the field ticket of 1552 to each of them.

This I judge is not so fine a plant as *Rh. niphobolum.* It has smaller flowers and none when dried are so bright as those of *Rh. niphobolum.*

4741 **Rhododendron coccinopeplum,** Balf. f. et Forrest.

Frutex vix 1 m. altus. Rami crassi, annotini ad 5 mm. diam. indumento crasso lanato coccineo induti, seniores perulati et foliis per annos 2–3 persistentibus vestiti. Alabastra oblonga acuta glutinosa; perulae exteriores crustaceae circ. 1 cm. longae

basi rotundatae longe caudatae cauda plus minusve recurva, intimae membranaceae ligulatae acutae circ. 2.5 cm. longae 4 mm. latae. Folia petiolata ad 9.5 cm. longa 2 cm. lata; lamina crasse coriacea rigida anguste obovalis, obtusa nunc ad apicem subattenuata et acutiuscula, margine revoluta, deorsum in petiolum brevem alatum gradatim angustata; supra laete viridis nitens in modum squali corii rugulosa glabra (costa media sulcata excepta), venis primariis utrinsecus circ. 12 paullo impressis; subtus laete coccineo-lanata indumento persistente bistrato (costam mediam tegente) ex toto vestita, strati superi pilis fibrillosis coloratis delicatis longe ramosis superficiem laxam aedificantibus, strato infero e pilis rosulatis longe vesiculosim ramosis in pelliculam continuam alb-idam agglutinatam constructo; petiolus crassus ut rami indumento involutus. Flores in umbellas compactas plurifloras ad extremitatem ramorum inter folia dispositi; bracteae persistentes intimae obovato-spathulatae mucronulatae circ. 2.5 cm. longae 1 cm. latae extus pilis rectis sericeae apicem versus et circa mucronem pilis rufis contortis decoratae et ciliatae; bracteolae flavae circ. 6 mm. longae pilosae et pilo-cristatae; pedicelli circ. 1 cm. longi floccosi et glandulosi. Calyx parvus vix 1.5 mm. longus carnosulus cupula glandulosa; lobi 5 rotundati vel semi-lunati glabri. Corolla infundibuliformis circ. 3.5 cm longa maculata intus puberula extus glabra basi subgibbosa; lobi 5 rotundati emarginati circ. 8 mm. longi 1.8 cm. lati. Stamina 10 circa stylum longiorem aggregata inaequalia, longiora circ. 2.3 cm. longa breviora 1.3 cm.; filamenta deorsum complanata, in staminibus longioribus ad medium in brevibus fere ex toto villosa; Discus glaber. Gynaeceum circ. 2.5 cm. longum corolla multo brevius; ovarium subcylindricum circ. 4 mm. longum truncatum sulcatum dense glandulosum; stylus validus sursum in labium substigmatosum stigmate latius paullo expansus. Species Seriei Roxieani.

S.W. Szechwan. Mu-li Mts. 12,000 ft. Forrest **16,379.** June 1918.

S.W. Szechwan. Mu-li Mts. In unripe fruit. Forrest **17,155.** Oct. 1918.

Allied to *Rh. protoïdes*. But see: the glutinous buds, with long-tailed perulae recurving; its scarlet indumentum with a lower stratum of rosulate hairs forming a pellicle; its glandular and floccose pedicel; the densely glandular ovary. All distinctive marks.

Rhododendron codonanthum, Balf. f. et Forrest.

Frutex ad 9 dm. altus plus minusve rubro-glandulosus et tomento rufo detersili indutus. Ramuli annotini ad 2 mm. diam.

Alabastrorum perulae rubrae, extimae ovatae apiculatae extus dense rufo-tomentosae et rubro-glandulosae, intimae ligulato-spathulatae circ. 2 cm. longae glandulosae et glanduloso-ciliatae. Folia petiolata ad 7 cm. longa; lamina crasse coriacea lanceolata circ. 6 cm. longa vix 2 cm. lata, utrinque attenuata apice subacuminata, hydathodo tuberculato parvo terminata, margine recurva, basi obtusa; supra atro-viridis opaca minute rugulosa glabra sed pilorum glandularumque juvenilium vestigiis hic et illic notata, costa media sulcata, venis primariis circ. 10 utrinsecus occultis; subtus indumento detersili rufo e pilis intricatim intertextis composito plus minusve vestita circa costam mediam pallidiorem prominulam rufo-glandulosa; petiolus vix 1 cm. longus plus minusve tomentosus et glandulosus sed glabrescens. Flores in umbellas 6-floras dispositi; bracteae intimae obovato-spathulatae circ. 1.75 cm. longae minute glanduloso-ciliatae; pedicelli circ. 2 cm. longi minute glandulosi. Calyx cupularis circ. 3 mm. longus fere ad basim in lobos 5 fissus; lobi pallide flavi oblongo-ovati glandulis parvis rubris ciliati. Corolla laete flava postice coccineo-maculata campanulata circ. 2.5 cm. longa; tubus subinflatus extus glaber intus minute puberulus; lobi 5 circ. 1 cm. longi 1.5 cm. lati emarginati. Stamina 10, 5 paullo longiora circ. 1.5 cm. longa corolla multo breviora; filamenta a basi fere ad apicem glutinoso-villosa; antherae oblongae vix 2 mm. longae. Discus glaber. Gynaeceum vix corollam aequans, staminibus longius; ovarium petasiforme circ. 3.5 mm. longum leviter sulcatum dense rufo-glandulosum glandulis stipitatis; stylus ex toto rufo-glandulosus; stigma discoideum coccineum lobulatum. Species ex affinitate *Rh. floccigeri,* Franch.

N.W. Yunnan. Mekong-Yangtze divide. East of Yeh-chih 2 days S. of Tsedjong. Lat. 27° 40′ N. Long. 99° 8′ E. In open scrub on rocky hillsides. Rare! Forrest No. **19,810.** 8 August 1921.

A delightful bright yellow-flowered species amongst those with detersile indumentum and glandular ovaries and styles such as *Rh. floccigerum,* Franch., *Rh. maculiferum,* Franch. and the like.

Rhododendron coelicum, Balf. f. et Farrer.

Fruticulus tenuis parvus. Rami crassi annotini circ. 3 mm. diam. glabri. Alabastra brunnea ovoideo-conoidea glutinosa; perulae exteriores plus minusve rotundatae et apiculatae tenui-marginatae extus glandulis rubris sessilibus dense obtectae. Folia petiolata ad 8 cm. longa; lamina crasse coriacea obovata ad 7 cm. longa 4 cm. lata, apice rotundata tuberculato-mucronata nunc retusa, basi obtusa; utrinque in juventute dense tomentosa et ad medium basim versus dense rubro-glandulosa; in maturitate

supra atro-violacea glabra, costa media sulcata, venis primariis utrinsecus 8-10 fere occultis; subtus matura cinnamomea dense lanato-tomentosa, costa media purpurea plus minusve glabrescente, indumento ad circ. 1 mm. crasso e pilis dendriformibus copiose ramosis ramis intertextis stratum unum fingentibus aedificato; petiolus purpureus circ. 1 cm. longus glandularum vestigiis plus minusve notatus. Flores in umbellam plurifloram compactam globosam dispositi; bracteae interiores membranaceae cervinae cucullatae oblongo-obovatae dense sericeae ad 3 cm. longae; bracteolae lineari-filiformes circ. 1.3 cm. longae a basi pilosae albo-cristatae; pedicelli 1 cm. vel ultra longi dense rubro-glandulosi. Calyx circ. 3 mm. longus; cupula carnosula in limbum 2 mm. longum membranaceum rubrum obscure et undulatim 5-lobum persistentem ampliata. Corolla infundibuliformi-campanulata coccinea circ. 4 cm. longa intus septis incompletis ornata basi 5-gibbosa, sacculis subatro-kermesinis; lobi emarginati 1.2 cm. longi 2.2 cm. lati. Stamina 10 inaequalia, longiora circ. 3.5 cm. longa, breviora circ. 2 cm. longa; filamenta glabra. Discus glaber. Gynaeceum corollam fere aequans; ovarium conoideum circ. 5 mm. longum truncatum sulcatum dense rubro-glandulosum; stylus glaber; stigma parvum.

N.E. Upper Burma. Chawchi Pass. Alt 11,000 ft. = Farrer No. 815 [*Rh. acmulorum*]. Flowering in the snow. Far finer than at Hpimaw making blots of scarlet visible for miles. Calyx, leaves and pedicels all of the same texture and the same intense dark scarlet as the flower (this seems occasional only). The plant here (if indeed the same) is not, or very rarely, a small stout tree, but rather a thin low little bush, flopping over precipices or making a tangle in the cane-brake. Farrer No. **1548.** May 15, 1920.

Mr Farrer's second thought expressed in the field note is justified. This Chawchi Pass plant is not as he at first supposed it to be the *Rh. acmulorum* which he saw and collected at Hpimaw Pass under No. 815, but a splendid new species of the same series (Haematodes) easily distinguished from *Rh. acmulorum* by the smaller leaves glandular more or less or with traces of glands, the thin glandular pedicels and the densely glandular ovary.

To a casual look this Chawchi Pass plant resembles more closely Ward's *Rh. mallotum*—and I must say here that further examination and comparision of the Wardian specimen of *Rh. mallotum* begets in me a doubt as to its specific distinctness from *Rh. acmulorum*. The material of it for study is very slight—a few separate leaves and a couple of flowers all stamped with the mark of drying in the tropics. The leaves are all much smaller than in *Rh. acmulorum*, their underleaf indumentum

seems to want the under stratum of rosulate hairs, the flowers are few and much smaller in all parts—and altogether it looks so different that I did not bring the later arriving large-leaved and flowered specimens which were described as *Rh. aemulorum* into correlation with it. If they be the same then the name *aemulorum* gives way to *mallotum*. Rather than make this name-change just now on the evidence I leave the two names giving the caveat I enter above.

4945 **Rhododendron commodum,** Balf. f. et Forrest.

Frutex ad 1 m. altus copiose ramosus. Rami sparsim lepidoti setulosi, annotini ad 1.5 mm. diam., vetustiores griseo-albidi esetulosi. Alabastra fusiformia perulis extus dense lepidotis brevissime ciliatis obtecta. Folia petiolata ad 5 cm. longa; lamina coriacea rigida ovalis vel oblongo-ovalis nunc subobovato-ovalis ad 4.5 cm. longa 2.3 cm. lata, apice obtusa tuberculato-mucronulata, margine cartilaginea subplana obscure undulata, basi obtusa; supra pallide viridis opaca glabra (speciminibus nostris fungorum fructificatione profuse infectis); subtus brunneo-grisea papillis epidermicis ceriferis tecta et squamis brunneis impressis inaequalibus discontiguis (in quoque mm. quadr. circ. 12–14) lepidota, costa media straminea elevata sparsim lepidota, venis primariis subobcultis; petiolus circ. 5 mm. longus ut rami vestitus. Flores in umbellas terminales compactas ad 6-floras aggregati; bracteae bracteolaeque deciduae; pedicelli validi breves circ. 8 mm. longi erecti squamis aurantiacis vel rubris lucentibus coruscantes. Calyx circ. 3.5 mm. longus profunde 5-partitus; lobi subelliptici ad 3 mm. longi 2 mm. lati flavidi extus squamis aurantiacis ut pedicelli coruscantes (sub fructu aucti et cum squamis persistentibus scintillantibus intense rutilantes). Corolla laete sulfurea subrotata ad 1.5 cm. longa 5-loba; tubus latus ad 8.5 mm. longus intus et basi extus glaber subhelvolus; lobi subaequales, posterior major circ. 8.5 mm. longus 1 cm. latus, omnes extus circa lineam mediam squamis coruscantes. Stamina 10, 5 longiora interpetalina ad 1.3 cm. longa, 5 anti-petalina breviora circ. 9 mm.; filamenta basim glabram 2 mm. longam exhibentia supra intra corollae tubum floccoso-villosa; antherae oblongae magnae circ. 3 mm. longae. Discus obscure puberulus. Gynaeceum corolla staminibusque brevius circ. 8 mm. longum; ovarium conoideum circ. 2 mm. longum sulcatum lepidotum; stylus basi lepidotus infra medium abrupte deflexus ad apicem sub stigmate discoideo lobulato subampliatus. Capsula circ. 8 mm. longa ab apice ad basim 5-valvatim dehiscens. Species ex affinitate *Rh. sulfurei*, Franch.

Western Yunnan. N'Maikha-Salween divide. Eastern flank. Lat. 26° 20′ N. Alt. 11–12,000 ft. Open rocky situa-

tions and on cliffs. Shrub of 2–3 ft. Flowers yellow. Forrest No. **17,866.** May 1919.

Western Yunnan. Shweli-Salween divide. Lat. 25° 40′ N. Alt. 11–12,000 ft. Amongst scrub in rocky gullies. Shrub of 2–3 ft. Flowers greenish yellow. Forrest No. **18,152.** June 1919.

N.E. Upper Burma. Farrer No. **861.**

A remarkable species of the phylum of *Rh. Boothii,* Nuttali easily distinguished by its setulose stems, its smaller flowers glabrous inside, its short pedicels like the calyx and corolla outside coruscating with shiny yellow scale-glands which become afterwards bright red as does the whole calyx under fruit.

Rhododendron cremnastes, Balf. f. et Farrer.

Suffrutex lignosus parviflorus prostratus breviter intricatimque ramosus vix 1 dm. altus incrementa annua vix 1 cm. longa fingens. Rami hornotini vix 1 mm. lati squamis stipitatis demum decapitatis spadiceis imbricatis involuti, vetustiores nigricantes stipitibus dense rugulosi. Alabastrorum perulae lineari-lanceolatae acuminatae carinatae lepidotae sparsim setuloso-ciliatae. Folia petiolata ad 2 cm. longa; lamina crasse coriacea obovalis circ. 1.8 cm. longa 8 mm. lata, apice rotundata mucrone rubro tuberculato terminata, margine paullo recurva (in juventute setulis paucis rarius praedita), deorsum gradatim in petiolum angustata; supra laete viridis opaca laevis squamis siccis plus minusve spadiceis latis superficialibus fere contiguis induta, costa media sulcata rubida, venis primariis occultis; subtus primo albida nitida squamis albidis imbricatim vestita demum subviridis et brunneo-tincta squamis uniformibus impressis nitidis spadiceis partim discontiguis (intervallo pallide viridi quam squamarum diametrum minore) lepidota, squamis omnibus latis quaque ex umbone rufo-infiltrato lato saepe annulo intensius colorato cincto et semper instita aequilata integra aedificata; petiolus circ. 2 mm. longus dense squami-verruculosus. Flores solitarii terminales; bracteae sub anthesi plus minusve persistentes pedicellos ad basim cingentes, intimae circ. 5 mm. longae 4 mm. latae late ovatae apiculatae lepidotae et ciliatae; pedicelli circ. 1 cm. longi inter folia immersi tenues stricti squamis stipitatis dense verruculosi. Calyx cupuliformis circ. 4.5 mm. longus flavo-viridis nunc partim rubro-tinctus ultra medium 5-fissus; cupula circ. 1 mm. longa; lobi inaequales omnes subrotundati extus lepidoti squami-ciliati, posticus major circ. 3.5 mm. longus 2.5 mm. latus, anterolaterales circ. 2 mm. longi 1.5 mm. lati. Corolla pallide rosea minute maculata rotata subzygomorpha circ. 1.4 cm. longa (expansa 2.5 cm. diam.); tubus circ. 3 mm. longus intus sparsim puberulus; limbus extus

dense lepidotus disco circ. 3 mm. longo intus puberulo; lobi oblongo-ovales apice rotundati vel subtruncati circ. 8 mm. longi 6.5 mm. lati. Stamina 10 alternatim paullo inaequalia corolla breviora, longiora circ. 1 cm. longa, breviora circ. 8 mm.; filamenta supra basim nudam infraque medium villosa. Discus puberulus. Gynaeceum breve staminibus brevius circ. 7 mm. longum; ovarium ovoideum sulcatum truncatum dense lepidotum circ. 2.5 mm. longum; stylus ruber crassus subdecurvatus basi squamis paucis indutus sub stigmate magno lobulato incrassatus, ad 4.5 mm. longus sed nunc circ. 2 mm. solum et ovario subbrevior. Species Seriei Lapponici.

N.E. Upper Burma : Chimili. Alt. 11,000 ft. Confined to a few gullies facing W. on the ascent of the Chimili Pass where it is only to be seen in the sheerest and shadiest precipices. Flowers soft bright pink, scentless, with pale chestnut flecklings. Farrer No. **1196.** Aug. 8, 1919.

A distinct species of some merit in the Lapponicum Series forming a dense cushion of twigs and foliage dotted over with the rose-coloured rather large (in the Series) open flowers. It belongs to that set of the Lapponicums in which the underleaf indumentum scales at first silvery and shining and overlapping become later tinted a brown colour and the expansion of the leaf surface somewhat separates the scales exposing chinks of green intervening surface. But some of the scales are always in contact. The stalked scales of the stem and verruculose later surface is very characteristic and then there is the arrangement of solitary flowers.

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Rhododendron damascenum, Balf. f. et Forrest.

Suffrutex parvulus ad 1 dm. altus tapetem faciens. Rami breves perulati annotini sparsim lepidoti et puberuli circ. 1.5 mm. diam. Folia petiolata ad 1.7 cm. longa; lamina crasse coriacea obovata vel oblongo-obovata, apice rotundata tuberculatim mucronulata, margine leviter revoluta obscure crenulata (crena quaque squamam peltatam gerente), basi in petiolum attenuata; supra olivacea subnitida glabra sed squamarum juvenilium vestigiis obscure notata; subtus pallidior vel brunneo-viridis reticulato-venulosa lepidota et obscure punctulata, squamis parvulis discontiguis (in quoque quadr. mm. circ. 2–3), costa media prominula saepe erubescente sparsim lepidota; petiolus circ. 2 mm. longus ut rami vestitus. Flores terminales solitarii vel bini; bracteae coriaceae basim pedicellorum sub anthesi cingentes; pedicelli crassi purpurei glabri vel sparsim lepidoti sub calyce ampliati. Flos secundus. Calyx ruber 5-partitus; lobi ovati circ. 6 mm. longi integri glaberrimi. Corolla campaniformis ad 1.7 cm. longa coeruleo-purpurea vel fere nigra cero-glauca carno-

sula basi gibbosa extus glabra intus basi pubescens 5-loba; lobi rotundati integri circ. 7 mm. diam. ascendentes vel leviter recurvi. Stamina 10 subaequalia corolla multo breviora circ. 9 mm. longa; filamenta purpurea supra tenuia ad basim solum incrassata et complanata ibique floccoso-puberula. Discus puberulus. Gynaeceum corolla brevius staminibus longius circ. 1.4 cm. longum; ovarium petasiforme sulcatum truncatum ad 4 mm. longum squamis parvulis dense lepidotum; stylus crassus sursum clavatim ampliatus glaber leviter decurvo-declinatus; stigma lobulatum. Species Seriei Campylogyni *Rh. campylogyno* affinis.

W.N.-W.-Yunnan. Mt. Sela. Fleur noirâtre. 16 July. **Soulié.**

W. N.-W.-Yunnan. Mekong-Salween divide. Lat. 27° 28′ N. Alt. 15–16,000 ft. Growing as an under-plant amongst dwarf species of Rhododendron and underscrub on moist rocky mossy slopes. Erect plant of 3–4 inches. Flowers solitary. Corolla thick fleshy and almost black with a bluish bloom similar to that of a plum. Forrest No. **475.** July–Aug. 1905.

W.N.-W.-Yunnan. Mekong-Salween divide N.W. of Tzeku. Lat. 28° 15′ N. Alt. 13,000 ft. Amongst scrub in moist situations. Forrest No. **504.** July 1904.

W.N.-W.-Yunnan. Mekong-Salween divide. Mts. N. of Atuntzu. Lat. 28° 35′ N. Alt. 14,000 ft. Forrest No. **14,004.** June 1917.

W.N.-W.-Yunnan. Ka-gwr-pw glacier valley. 14,000 ft. Dwarf rhododendron forming carpet with other species. Flowers blood-red. Kingdon Ward, No. **793.** 18 July 1913.

A Mekong-Salween species very like to *Rh. campylogynum* (a Tali plant) and not separated by Franchet in his general picture of *Rh. campylogynum*. Like though they are they differ by easily seen characters. The scabrid young stems described by Franchet in *Rh. campylogynum* are caused by hardened scales. In *Rh. damascenum* there are few soft scales and also hairs. Then in the flower the 10 stamens are very different with their small basal tuft of hairs and the more fleshy filament generally.

38 **Rhododendron depile,** Balf. f. et Forrest.

Frutex ad 2 m. altus. Ramuli stricti tenues hornotini circ. 1.5 mm. diam. epilosi lepidoti rubidi, annotini circ. 2 mm. diam. subglauci, demum grisei. Folia petiolata ad 7 cm. longa; lamina subchartacea ovalis ad 5.5 cm. longa 3 cm. lata, apice late obtusa breviter mucronata, margine cartilaginea paullo recurva, basi late obtusa vel subrotundata nec cordulata; supra nitida olivacea granulosa elepidota epilosa, costa media erubescente vix sulcata,

venis primariis utrinsecus circ. 8–10 paullo elevatis; subtus fulvida dense discontigue lepidota intervallis viridibus diametrum squamarum aequantibus, squamis peziziformibus uniformibus impressis nitidis rubiginosis umbone lato concavo resinoso-punctulato institaque angusta membranacea albido-flavida vel roseotincta, costa media glaberrima, venis primariis occultis; petiolus circ. 1.5 cm. longus sulcatus ut ramuli vestitus. Flores in umbellas 4-floras terminales dispositi; bracteae mox deciduae; bracteolae lineares sursum dilatatae circ. 1.2 cm. longae membranaceae a basi pilosae dorso lepidotae apice pilocristatae; pedicelli validi circ. 2 cm. longi purpurei sparsim lepidoti sub flore expansi. Calyx cupuliformis ad 4 mm. longus; cupula glauco-purpurea lepidota circ 1.5 mm. longa; limbus membranaceus brunneus 5-lobus; lobi inaequales rotundati vel deltoidei squamo-fimbriati. Corolla rosea emaculata ad 4 cm. longa ex tubo brevi lato subcampanulato in limbum 5-lobum ampliatum patentem expansa paullo zygomorpha extus glabra; tubus intus pubescens; lobi rotundato-ovales circ. 1.5 cm. longi 2 cm. lati undulati. Stamina 10 inaequalia corolla paullo breviora; filamenta basim nudam versus puberula. Discus sub ovario puberulus. Gynaeceum ad 4.5 cm. longum corollam excedens; ovarium conoideum truncatum ad 4 mm. longum dense lepidotum; stylus glaber sub stigmate lobulato expansus. Species Seriei Triflori, phyli *Rh. oreotrephis*.

Western N.W. Yunnan. Bei-ma-shan. 12,000 ft. Forrest No. **13,992.** June 1917.

A general want of hairs on vegetative parts—none on stems or leaves—marks this species. Other marks : very smooth elepidote upper surface of young expanding leaves—under-leaf scales not touching on these young leaves; impressed scales on underleaf close set; bracteoles ¼ shorter than pedicels; purple pedicels; limb of calyx relatively large; corolla short and wide-tubed—tube hairy inside; style very long. Note leaves are never cordulate.

Compare with *Rh. trichophorum* where you have hairs and a nearly or quite cordulate leaf-base and a puberulous midrib above. Scales on young leaf are dense and overlap.

This belongs to the impressed scale group in its phylum with midrib below esquamulate.

Rhododendron didymum, Balf. f. et Forrest.

Fruticulus. Rami recti annotini purpurei glandularum setulosarum vestigiis plus minusve praediti. Alabastrorum perulae plus minusve persistentes. Folia parva in pseudoverticellos disposita per annos 3–4 persistentia 4.5 cm. longa petiolata; lamina rigida crasse coriacea obovata ad 4 cm. longa

1.8 cm. lata apice late obtusa mucrone apiculato conspicuo terminata, margine cartilaginea dura compactim recurva, basi attenuata cuneata; supra atro-viridis laevis glabra, costa media sulcata glabra sed glandulis sparsis minute notata, venis primariis occultis; subtus cinerea plus minusve mycophylloidea et fuliginosa, costa media straminea prominula, venis primariis utrinsecus ad 8 sub indumento elevatis, ubique indumento persistente crasso bistrato tomentoso vestita, strati superi superficie laxe alveolata; petiolus ad 5 mm. longus purpureus pilis vestigialibus et glandularum pedibus obtectus nunc glandulis perfectis obsitus. Racemo-umbella circ. 4-flora, rhachi brevi circ. 1 cm. longa setuloso-glandulosa; bracteae fertiles cucullatae ad 1.5 cm. longae 8 mm. latae obovatae apiculatae sericeae et sebaceo-glutinosae; bracteolae ligulatae superne latiores ex toto pilosae pilo-cristatae; pedicelli virides ad 3 cm. longi dense setuloso-glandulosi ad apicem oblique expansi. Calyx obliquus zygomorphus ubique extus setuloso-glandulosus; cupula parva vix 1 mm. longa margine postice lobis 3 roseis rotundatis ornata antice vix lobata. Corolla atro-kermesina tubuloso-campanulata vix 2.5 cm. longa paullo gibbosa intus sparsim puberula; lobi 5 vix emarginati vix 1 cm. longi 1.5 cm. lati. Stamina 10 inaequalia, longiora circ. 2 cm. longa, breviora 1.2 cm. longa; filamenta glabra. Discus sparsim puberulus. Gynaeceum circ. 2.5 cm. longum corollam aequans; ovarium petasiforme circ. 2.5 mm. longum sulcatum truncatum ad juga glandulis setulosis dense obtectum in sulcis pilis variis vestitum; stylus glaber; stigma lobulatum stylo paullo latius.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Forrest No. **20,220**.

A remarkable discovery. In *Rh. haemaleum* we have a Rhododendron of the Sanguineum Series showing a black-crimson flower. Here is another. Evidently a plant smaller in all its parts than *Rh. haemaleum* but presenting us with a flower of all the intensity of colour met with in that species. The characters by which it may be separated from *Rh. haemaleum* are such as preclude any suggestion of conspecificity. *Rh. didymum* is essentially a glandular plant which *Rh.haemaleum* is not. Young stems and leaves, pedicels, ovary are all setulose-glandular and then the filaments of the stamens are quite glabrous.

Rhododendron epapillatum, Balf. f. et Cooper.

Arbor 5 m. alta. Rami annotini crassi 3.5 cm. diam. sparsissime glandulosi. Folia petiolata 15 cm. longa; lamina coriacea rigida oblongo-obovalis 13 cm. longa 4 cm. lata, apice obtusa sed subrostratim mucronata mucrone parvo, margine cartilaginea subrecurva obscure asperata, basi obtusa vel subcuneata; supra

pallide viridis opaca laevis glabra; subtus pallidior flavido-viridis sine papillis epidermicis delicatim puberula pilis detersilibus, costa media elevata, venis primariis circ. 16 prominulis, reticulo ultimo superficiem rugulosam fingente; petiolus circ. 2 cm. longus validus ut rami vestitus. Racemo-umbella 10-flora (vel ultra), rhachi 3 cm. longa viridi sparsissime glandulosa et pilosa; bracteolae filiformes vix 1 cm. longae pilosae; pedicelli circ. 2 cm. longi sparsim glandulosi et pilosi. Calyx persistens 3 mm. longus; cupula atro-kermesina breviter glandulosa in limbum 5-lobum membranaceum ochraceum 2 mm. longum expansa; lobi rotundati 4 mm. lati glabri sed sebaceo-ciliati. Corolla magna pallide rosea rubro-maculata varo magno basali decorata infundibuliformi-campanulata 5.5 cm. longa extus intusque glabra 5-loba; lobi rotundati emarginati 1.4 cm. longi 2.5 cm. lati. Stamina 10 inaequalia corolla et gynaeceo breviora, longiora 4 cm. longa, breviora 3 cm.; filamenta glabra. Discus glaber. Gynaeceum 6 cm. longum corollam superans; ovarium conoideum sulcatum truncatum 6 mm. longum glandulis magnis fere sessilibus cum pilis fasciatim floccosis paucioribus conspersum; stylus longus exsertus glandulis breviter stipitatis sparsim praeditus; stigma discoideum.

Bhutan. Chukka Timpu. Alt. 6,000 ft. Tree 17 ft. Flowers pale pink, red spots. R. E. Cooper. No. **3816.** 24.4.15.

A species of the Irroratum Series gathered by Cooper in Bhutan. Its alliance is with *Rh. Kendrickii*, Nutt. and with *Rh. papillatum*, Balf. f. et Cooper. *Rh. papillatum* is likest to it but may be separated by the leaf-shape, to careful minute observation by the absence of epidermal papillae on the leaf under side and also of the large spread out hairs of indumentum, by the membranous larger calyx, by the much larger corolla, by the glabrous stamens, by the sparingly glandular and hairy ovary, by the glandular style. *Rh. Kendrickii* in addition to clothing of young stems and the leaf-form differences has almost glabrous pedicels, calyx of 5 fleshy lobes, corolla crimson unblotched only 3 cm. long, stamens only 2.5 cm. long, ovary glabrous or most sparingly sebaceous floccose, style glabrous, narrower stigma.

I should like to have made out that one of the plants I have described here under the names of *Rh. papillatum* and *Rh. epapillatum* was Nuttall's *Rh. Shepherdi* from Bhutan of which no wild specimens are known but the ovary which is said to be quite glabrous in *Rh. Shepherdi* separates it. *Rh. Shepherdi* is I think clearly one of the Irroratum Series.

Rhododendron epipastum, Balf. f. et Forrest.

Fruticulus. Rami juveniles indumento albido e pilis ramosis

adpressis arachnoideis constructo vestiti, annotini circ. 1.5 cm. diam. indumenti vestigiis plus minusve notati. Perulae fugitivae. Folia petiolata ad 8 cm. longa; lamina subchartacea anguste oblonga vel obovalis ad 7.5 cm. longa 2.5 cm. lata nunc paullo obliqua, apice late obtusa nunc rotundata breviter purpureo-mucronata, margine cartilaginea subplana, basi late obtusa; supra in juventute plus minusve floccosa maturitate laete viridis interdum purpurascens, costa media sulcata, venis primariis utrinsecus ad 12 paullo pinnatim impressis; subtus initio alba demum cinerea vel viridi-grisea indumento unistrato laxo tenui quasi detersili e pilis rosulatim ramosis adpressis velum apertum supra superficiem viridem aedificante vestita, costa media elevata paullo erubescente et sparsim floccosa; petiolus circ. 5 mm. longus ut rami vestitus. Umbella circ. 4-flora; pedicelli circ. 1.5 cm. longi setulis paucis induti eglandulosi sparsim floccosi apice incrassati. Calyx parvus circ. 4 mm. longus 5-lobus; cupula sparsim breviterque setulosa; lobi circ. 2 mm. longi rotundati vel ovati dorso glabri margine breviter setuloso-ciliati rubri circum basim corollae adpressi persistentes. Corolla rosea circ. ad 3 cm. longa aperte campanulata basi paullo gibbosa et intensius colorata; lobi parvi 1 cm. longi 1.5 cm. lati. Stamina 10 circum stylum aggregata ad 2.7 cm. longa; filamenta glabra. Discus vix puberulus. Gynaeceum corollam subaequans; ovarium circ. 4 mm. longum pilis fasciatis et glandulis setulosis paucioribus vestitum; stylus glaber; stigma subdiscoideum. Species Seriei Sanguinei.

S.E. Tibet. Tsarong. G. Forrest No. **18,645.** 1917.

This does not appear in dried specimens as a very attractive plant. It is one of the Sanguineum Series showing connection with several species but yet differing in its aggregation of characters from all of them. With a primitive thin white indumentum it has no glands; the underleaf indumentum is so thin and open that the green leaf-surface may be seen between the hairs; the pedicels have only a few setulose and floccose hairs, no glands; the calyx quite small and like that of *Rh. sanguineum* itself only never reflexing and the 5 red lobes appear as lateral patches at base of developing fruit; corolla rose and small; stamens glabrous; ovary tomentose with fasciate hairs and a few setulose glands.

Rhododendron globigerum, Balf. f. et Forrest.

Frutex validus ad 1 m. altus. Rami crassi, hornotini circ. 5 mm. diam. tomento crasso persistente albido-rufescente obtecti, annotini nigricantes perulis alabastrorum persistentibus vestiti. Alabastra oblonga perulis flavo-brunneis dense rufo-ciliatis dorso tenuiter tomentosis et rubro-glandulosis imbricatim inclusa.

Folia petiolata ad 9 cm. longa; lamina crasse coriacea rigida oblongo-ovalis vel obovalis ad 8 cm. longa 3 cm. lata, acuta mucrone inconspicuo terminata, margine crasse cartilaginea paullo recurva, basi cuneata saepe inaequilateralis; supra purpureo-viridis opaca in modum squali corii rugulosa glabrescens sed pilis vestigialibus obscure notata, costa media anguste sulcata pilis albidis impleta, venis primariis utrinsecus circ. 12 paullo impressis; subtus fulva indumento bistrato crasso (ad 1 mm.) lanato ex toto vestita, pilis strati superi complanatis intricatim ramosis et intertextis, strati inferi parvis rosulatis; petiolus circ. 1 cm. longus crassus dense lanato-tomentosus. Gemmae florales globosae magnae bracteis exterioribus latis rotundatis dorso pilis albidis vel kermesino-scintillantibus glutinosis et glandulis rubris viscidis sub anthesi plus minusve persistentibus imbricatim involutae. Flores in umbellas compactas globosas parvas circ. 5 cm. diam. plurifloras dispositi; bracteae intimae oblongo-obovales sericeae; pedicelli circ. 1 cm. longi dense lanati. Calyx obsoletus undulatus. Corolla alba kermesino-maculata parva circ. 2.7 cm. longa zygomorpha campanulata subnutans extus glabra intus puberula; tubus carnosulus basi subgibbosus; lobi 5 rotundati emarginati circ. 1.5 cm. longi 2 cm. lati. Stamina 10 circa stylum aggregata inaequalia, longiora circ. 1.7 cm. longa, breviora 1.3 cm.; filamenta puberula. Discus puberulus. Gynaeceum circ. 2 cm. longum corolla brevius staminibus longius; ovarium conoideum sulcatum truncatum circ. 4 mm. longum sparsim floccosum; stylus glaber validus sub stigmate lobulato vix expanso haud incrassatus. Species phyli *Rh. sphaeroblasti*.

S.W. Szechwan. Mu-li Mts. Lat. 28° 12′ N. 11–12,000 ft. In thickets and on open rocky slopes. Shrub of 3–6 ft. Flowers white with crimson markings. Forrest **16,376.** June, 1918.

This belongs to a type which seems to come from Mu-li only. The indumentum of the leaves is very thick persistent and of long interlocking hairs with an under stratum of short ones. The whole leaf is soft in consequence. Note also the glutinous buds. The flower-buds are remarkably large globose with broad overlapping outer bracts. *Rh. sphaeroblastum* is one of the type and there is another with bright red indumentum and narrower leaves which I have yet to describe.

Rhododendron gloeoblastum, Balf. f. et Forrest.

Frutex pauci-ramosus. Rami hornotini dense glandulosi, annotini glabri vel verruculosi circ. 4 mm. diam. Alabastra rubra glutinosa elongato-ovoidea; perulae glandulis rubris dense vestitae folia revoluta involventes. Folia petiolata ad 9 cm. longa; lamina coriacea ovalis vel elliptica vel obovalis ad 7.5 cm.

longa 4 cm. lata plerumque brevior, apice rotundata vel late obtusa rostrato-mucronata, margine plana, basi cordulata; supra glabra purpurascens, costa media paullo sulcata ad medium flava, venis primariis utrinsecus ad 12 paullo prominulis; subtus primo glauca demum purpurascens pilorum juvenilium vestigiis notata, costa media elevata conspicue straminea rugam basi pinguem sursum mox attenuatam fingente, venis primariis vix visis; petiolus saepe brevis circ. 1.5 cm. longus nunc longior primo flavus dein purpurascens obscure glandulosus. Flores in umbellam veram circ. 8-floram dispositi; pedicelli ad 5 cm. longi validi dense glandulosi glandulis subsessilibus. Calyx foliaceus ad 1 cm. longus fere ad basim subinaequaliter 5-partitus; cupula atro-kermesina; lobi flavidi submembranacei glanduloso-ciliati dorso glabri vel rarius glandulis conspersi. Corolla magna circ. 7 cm. diam. flava aperte campanulata 4 cm. longa; lobi late rotundati emarginati 2 cm. longi 3 cm. lati. Stamina 10 brevia inaequalia, longiora circ. 2.5 cm. longa, breviora 1.5 cm.; filamenta glabra. Discus basim ovarii pilorum linea cingens. Gynaeceum staminibus paullo longius corolla paullo brevius circ. 3 cm. longum; ovarium conoideum plus minusve glandulosum sulcatum truncatum circ. 4 mm. longum; stylus validus ex toto dense glandulosus superne sub stigmate latiore lobulato incrassatus. Species Seriei Souliei.

S.E. Tibet. Tsarong. G. Forrest No. **18,672.** 1917.

Species of the phylum of *Rh. Wardii* distinguished by the glandular sticky leaf-buds, the small oval leaves with short yellow stalks and yellow midrib and glaucous under surface.

Rhododendron hedythamnum, Balf. f. et Forrest.

Frutex ab 2.5 m. altus tortuose ramosus. Rami ex incrementis annuis brevibus aedificati hornotini in axillis foliorum glandulis rubris breviter stipitatis obsiti, annotini circ. 3 mm. diam. glandularum vestigiis obscure induti nec strigillosi. Alabastrorum oblongorum acutorum circ. 3 mm. diam. perulae exteriores crustaceae rotundatae extus puberulae margine obscure ciliatae, intimae ligulato-spathulatae ad 3 cm. longae, membranaceae flavidae apiculatae extus puberulae margine pilis mollibus ciliatae. Folia petiolata ad 7 cm. longa; lamina crassiuscula elliptica vel suborbicularis ad 5.5 cm. longa 4 cm. lata apiculato-mucronulata, margine cartilaginea paullo recurva, basi cordata nunc truncatula; supra pallide olivacea glabra (in juventute setulis mox delapsis praecipue ad costam mediam dense obtecta), costa media sulcata, venis primariis utrinsecus 12 paullo impressis; subtus plus minusve cinerea papillis ceriferis epidermicis obtecta glandulis pilisque sebaceis plus minusve induta, costa media elevata, venis primariis vix manifestis; petio-

lus ad 2 cm. longus in juventute dense setuloso-glandulosus maturitate rugulosus glabrescens nunc vestigialiter notatus. Umbella ad 6-flora; pedicelli 1 cm. longi nunc paullo longiores virides glandulis breviter (et paucis longius) stipitatis induti sub calyce incrassati. Calyx ad 6 mm. longus; cupula kermesina glandulosa; lobi 5 membranacei flavidi inaequales, posticus major ad 5 mm. longus 2 mm. latus oblongi vel elliptici obtusi margine glandulosi. Corolla pallide rosea fere alba infundibuliformi-campanulata ad 4 4.5 cm. longa; lobi lati emarginati. Stamina 10 inaequalia, longiora circ. 2.5 cm. longa breviora 1.5 cm. corolla gynaeceoque breviora; filamenta puberula. Discus puberulus. Gynaeceum corolla paullo brevius staminibus longius circ. 3 cm. longum; ovarium elongatum circ. 5 mm. longum sulcatum ad juga breviter stipitato-glandulosum; stylus glaber sub stigmate lobulato ipso haud latiore paullo expansus. Species Seriei Selensis.

Mid Western Yunnan. Tali range. Western flank. Lat. 25° 40′ N. Alt. 11,000 ft. Rocky open slopes. Shrub of 4–5 ft. Flowers pale rose, almost white. Forrest No. **11,601.** June 1913.

To here also should be assigned I believe the specimens under Nos 4148 and 4154 which have previously been referred to *Rh. jucundum,* Balf. f. et W. W. Sm.

A beautiful plant belonging to the set of the Selense Series in which the leaves are rounded with marked cordate base. When describing *Rh. jucundum* (in Notes R.B.G. Edin. ix (1916) 242) I wrote of this plant from the Western flank of the Tali range as probably a new species. Now that I have obtained more knowledge of the plants of the Selense Series I confirm the differentiation from *Rh. jucundum* which is one of the series with oblong leaves and has besides more flowers in the umbel, longer thinner pedicels clad with few long setulose glandular hairs.

Rhododendron helvolum, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Rami subcrassi, annotini circ. 4 mm. diam. indumento cinereo tenui e pilis rosulatis intertextis composito vestiti, seniores nigrescentes mycelio fungorum indumentum ubique penetrante. Alabastra ovoidea sursum attenuata pallide brunnea; perulae imbricatae, extimae crustaceae rotundatae carinatae apiculatae extus griseo-tomentosae. Folia petiolata ad 11.5 cm. longa; lamina coriacea oblonga ad 10.5 cm. longa 3.5 cm. lata, sursum apicem versus paullo attenuata acuta vel rostratim acuta mucrone conspicuo terminata, margine plana, basi late obtusa nunc fere rotundata; supra purpureo-viridis subnitens fere laevis costa media sulcata puberula, venis primariis

utrinsecus circa 12 obscuris; subtus helvola opaca indumento persistente molli laevi obscure vestita, indumenti pilis rosulatis aliis brevibrachiatis patentibus aliis longibrachiatis et intertextis; petiolus circ. 1 cm. longus ut ramuli indutus. Inflorescentia breviter racemoso-umbellata circa 10-flora, rhachi puberula; bracteae bracteolaeque mox deciduae; pedicelli ad 1.3 cm. longi pilis tortuose ramosis dense vestiti. Calyx carnosulus pallidus cupuliformis circ. 1 mm. longus lobis 5 rotundatis glabris. Corolla roseo-suffusa kermesino-maculata infundibuliformi-campanulata circ. 3 cm. longa genitalia superans extus glabra intus minute puberula; lobi 5 late patentes breves rotundati circ. 1 cm. longi 1.8 cm. lati emarginati. Stamina 10 inaequalia, longiora circ. 2.5 cm. longa, breviora circ. 1.3 cm.; filamenta basim versus puberula. Discus sub ovario dense puberulus. Gynaeceum circ. 2.5 cm. longum corolla brevius; ovarium angustum sulcatum truncatum pilis tortuose ramosis glutinosis saepe rubiginosis sparsim indutum, apice breviter pilo-cristatum; stylus glaber. Species *Rh. dryophyllo* affinis.

Eastern N.W. Yunnan. Mts. N.E. of Chungtien. Lat. 28° N. 12–13,000 ft. In rhododendron forests. Shrub of 6–9 ft. Flowers flushed rose with crimson markings. Forrest **17,784.** Aug. 1918.

Eastern N.W. Yunnan. On the Chungtien plateau. Lat. 27° 40′ N. Alt. 11,000 ft. Open pine forests. Shrub of 6–9 ft. Flowers flushed rose, deepest round margin, with crimson markings. Forrest **14,041.** June 1919.

Allied to *Rh. dryophyllum* but the crested floccose ovary distinguishes it. See also *Rh. aiolopeplum*, Balf. f. et Forrest on a preceding page. The corollas are inordinately full of insects.

Rhododendron hesperium, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Ramuli tenues breviter virgati, hornotini circ. 1 mm. diam. glauco-purpurei epilosi sparsissime lepidoti, annotini rubro-purpurei demum albido-caerulei ad 2 mm. diam. Folia ad 6.5 cm. longa petiolata viridia deinde saepe aureo-colorata; lamina chartacea oblongo-ovalis ad 5.5 cm. longa 2 cm. lata, apicem versus plerumque paullo attenuata subacuta mucrone inconspicuo terminata, margine plana, basi cuneata vel obtusa; supra olivacea nitida minute reticulata glaberrima, costa media erubescente sulcata, venis primariis utrinsecus circ. 6–8 paullo elevatis; subtus pallide viridis squamis parvis distantibus (1.5–2 mm.) annulo aureo et instita minutissima notatis, costa media straminea nunc erubescente elevata glabra, venis primariis subrubidis; petiolus circ. 1 cm. longus supra sulcatus et lepidotus subtus glaber. Flores fragrantes in umbellas 3–4-floras ter-

minales dispositi; bracteae mox deciduae; bracteolae lineares superne paullo dilatatae circ. 1.3 cm. longae a basi pilosae superne dorso lepidotae pilo-cristatae; pedicelli atropurpurei ad 2 cm. longi sub calyce expansi glabri nunc squamis paucis praediti. Calyx carnosulus cupuliformis vix 1 mm. longus extus lepidotus margine undulatus et submembranaceus epilosus nunc squamoso-fimbriatus. Corolla campanulata zygomorpha violaceo-rosea maculata circ. 3 cm. longa extus glabra intus puberula; tubus latus brevis dorso extus bisulcatus basi postice subventricosus sursum in limbum ampliatum patentem 5-lobum ampliatus fauce lata; lobi ovales circ. 2 cm. longi 1.5 cm. lati. Stamina 10 inaequalia, longiora ad 3.5 cm. longa exserta, brevissimum (posticum) 1.5 cm.; filamenta deorsum dilatata supra basim nudam villosa. Discus sub ovario dense puberulus. Gynaeceum ad 4 cm. longum stylo longe exserto; ovarium parvum circ. 3 mm. longum conoideum truncatum dense lepidotum; stylus glaber sub stigmate discoideo lobulato recurvo vix expansus. Species Seriei Triflori.

Mid Western Yunnan. Tali Range. Western flank. Lat. 25° 40′ N. Alt. 10,000 ft. Open thickets. Shrub of 4–8 ft. Flowers lilac rose. [Only a fragment available. The chief specimens were sunk in the Indian Ocean in a ship torpedoed by the Germans.] Forrest **15,576.** June 1917.

[Under numbers **15,581, 15,586, 15,887, 15,625**—none with precise locality—we have fragmentary dried samples of specimens also torpedoed which are probably this *Rh. hesperium*].

A species of the phylum of *Rh. chasmanthum*, Diels, and *Rh. chasmanthoides*, Balf. f. et Forrest. The southern form of the type. Distinguished from *Rh. chasmanthoides* by its smaller features usually; branchlets epilose, leaves half the size, cuneate or narrowly obtuse base, esquamate upper surface, glabrous midrib above, smaller scales on under surface, its midrib quite epilose and elepidote, petiole glabrous underneath lepidote above quite epilose; fragrant flowers, pedicels usually elepidote; calyx barely 1 mm. long never hair-ciliate; corolla smaller never lepidote outside, puberulous inside.

Differences from *Rh. chasmanthum* I shall record elsewhere where I describe this species. Diels' account of it is insufficient.

Rhododendron horaeum, Balf. f. et Forrest.

Frutex perulatus foliis parvis dense rosulatim aggregatis. Rami hornotini circ. 1.5 mm. diam. indumento albo e pilis floccosis multo et longe ramosis stratum unum fingentibus induti. Alabastrorum perulae persistentes, interiores membranaceae primo fulvae demum brunneae ligulatae carinatae acutae margine sebaceo-pilosae circ. 1.5 cm. longae 2.5 mm. latae. Folia petio-

lata ad 5 cm. longa per annos 3–4 persistentia in pseudo-verticellos disposita; lamina crasse coriacea obovata ad 4 cm. longa 2 cm. lata, apice subrotundata obtusa mucrone tuberculato conspicuo terminata, margine cartilaginea paullo recurva, deorsum attenuata; supra olivacea opaca glabra (in juventute pilis floccosis albis plus minusve praedita), costa media sulcata, venis primariis utrinsecus circ. 8 conspicue impressis; subtus indumento unistrato crasso persistente lanato alveolato primo fulvo demum (in specimine nostro) fuliginoso-cinereo (quasi mycophyllon) e pilis (axe longo multiramoso) intertextis constructo vestita, costa media prominula flavida glabra; petiolus ad 1 cm. longus ruber incrassatus quasi vaginans. Umbella 4-flora; pedicelli circ. 2 cm. longi virides setuloso-glandulosi superne sub calyce incrassati. Calyx cupularis a cupula brevissima basali in limbum amplum coloratum inaequaliter et irregulariter 5-lobatum subzygomorphum 1.2 cm. longum deciduum glabrum expansus. Corolla kermesina ? emaculata tubuloso-campanulata 3.5 cm. longa carnosula gibbosa extus intusque glabra 5-loba; lobi rotundati paullo emarginati circ. 8 cm. longi 1.3 cm. lati. Stamina 10 brevia subaequalia circ. 1.7 cm. longa; filamenta basi minute et sparsim puberula. Discus glaber. Gynaeceum circ. 2.4 cm. longum; ovarium conoideum truncatum sulcatum 4 mm. longum pilis ascendentibus multiramosis tomentosum; stylus glaber; stigma lobulatum lobis patentibus.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Forrest No. **20,287**. 1921.

A species of the Sanguineum Series. In technical characters perhaps nearest to *Rh. roseotinctum*, Balf. f. et Forrest but easily told by its persistent clothing of leaf bud-scales and by its large calyx.

Rhododendron hylaeum, Balf. f. et Farrer.

Arbor magna 12 m. alta libro laevi nudo. Rami ultimi crassi, hornotini glandulis ovoideis fere sessilibus dense rubro-glandulosi, annotini circ. 7 mm. diam. glabri. Alabastra fusiformia; perulae extimae parvae crustaceae orbiculares vel rotundatae carinatae apiculatae imbricatae dorso puberulae intus ad apicem albo-sericeae, intimae ad 5 cm. longae submembranaceae superne obovato-spathulatae deorsum in petiolum gradatim angustatae extus glabrae intus panno circumscripto albo-sericeo ad apicem praeditae; folia juvenilia revoluta supra sparsim setulosa et breviter glandulosa, subtus glabra. Folia petiolata ad 14 cm. longa; lamina coriacea oblonga vel anguste oblongo-ovalis ad 12.5 cm. longa 4 cm. lata, apice obtusa vel subrotundata mucrone hydathodali brevi coronata, margine tenuiter cartilaginea laevis, basi subauriculata; supra olivacea opaca glabra, costa media

erubescente vix sulcata, venis primariis utrinsecus circ. 15 vix visis; subtus pallidior flavido-viridis, costa media prominula erubescente glabra, venis primariis albidis paullo sulcatis, reticulo venularum ultimarum intricato elevato, papillis epidermicis ceriferis cubicalibus petasiformibus latis humilibus; petiolus purpureus subglaucus circ. 1.5 cm. longus glaber. Flores in racemo-umbellam dispositi 10–12 in quaque inflorescentia, rhachi circ. 2 cm. longa puberula; bracteae interiores oblongo-obovatae truncatae apiculatae circ. 3 cm. longae 1 cm. latae dense albo-sericeae; bracteolae filiformes circ. 1.5 cm. longae a basi pilosae et pilo-cristatae; pedicelli circ. 1 cm. longi glauco-purpurei glaberrimi. Calyx cupularis membranaceus ochraceus circ. 5 mm. longus undulatim 5-lobatus glaber sed margine obscure denticulato-pilosus primo erectus demum deflexus persistens. Corolla pallide rosea kermesino-maculata tubuloso-campanulata 4.5 cm. longa extus intusque glabra basi septis incompletis notata et 5-gibbosa sacculis atro-kermesinis; lobi 5 profunde emarginati 1.5 cm. longi 2.5 cm. lati. Stamina 10 inaequalia, longiora tubum corollae aequantia; filamenta glabra. Discus glaber. Gynaeceum corolla paullo brevius; ovarium petasiforme circ. 5 mm. longum vix sulcatum truncatum laeve glaberrimum; stylus glaber; stigma lobulatum stylo paullo latius. Species Seriei Irrorati.

N.E. Upper Burma. Chawchi Pass. Alt. 10,500 ft. A tidy round-headed tree of 20–40 ft. with trunk remarkably smooth and bare and bald (see branchlets). Flowers so far gone by May 15 (though snow was all about) that only after long search were specimens obtained. They are scentless, pink and handsome, spotted rather carelessly on all the lobes. This develops the bole of a forest tree, twisting and sprawling like limbs of an elephant. Farrer No. **1551.** May 15, 1920. Irroratum Series?

Mr Farrer was correct in his placement of this species in the Irroratum Series—a series that includes many of the species of N.E. Upper Burma. This is a particularly large tree remarkably glabrous.

Rhododendron hypolepidotum, Balf. f. et Forrest.

Rh. brachyanthum var. *hypolepidotum*, Franch. in Journ. de Bot. xii (1898) 262.

Frutex ad 1.5 m. altus. Rami juveniles erubescentes lepidoti ad 1.5 mm. diam. Folia aromatica petiolata variabilia ad 7.5 cm. longa nunc vix 3 cm. ad apicem ramorum rosulatim aggregata; lamina subcoriacea oblongo-obovata ad 6.5 cm. longa 2.5 cm. lata vel minor, apice rotundata prominenter mucronata, margine subcartilaginea obscure crenulato-undulata, basi obtusa; supra pallide olivacea opaca squamis albidis discontiguis (in

quoque mm. quad. circ. 4) pruinosa; subtus primo albido-grisea (postea nunc pallide viridis) papillis epidermicis ceriferis ubique tecta et squamis biformibus discontiguis (in quoque mm. quad. circ. 7-8) lepidota saepe squamis majoribus nigricantibus uniformiter distributis punctulata, costa media elevata lepidota, venis primariis utrinsecus ad 10 prominulis; petiolus ad 1 cm. longus ut rami vestitus. Flores in racemo-umbellas 6-floras dispositi, rhachi brevi circ. 5 mm. longa lepidota et setulosa; bracteae sub anthesi plus minusve persistentes extimae crustaceae apiculatae extus lepidotae; pedicelli ad 4 cm. longi purpurei divaricati lepidoti. Calyx viridis 7 mm. longus profunde 5-lobatus; cupula extus dense lepidota; lobi circ. 6 mm. longi ovati subacuti extus plus minusve lepidoti margine squamo-ciliati. Corolla campaniformis lutea tenuiter carnosula circ. 1.5 cm longa basi subgibbosa et calyce coroniformi cincta, extus sparsim lepidota intus basi pubescens; lobi 5 rotundati integri circ. 6 mm. longi 8 mm. lati. Stamina 10 corolla breviora inaequalia; 5 longiora circ. 1.4 cm. longa, 5 breviora circ. 1 cm.; filamenta a basi brevi glabra sursum ultra medium villosa. Discus glaber. Gynaeceum staminibus brevius vix 1 cm. longum; ovarium petasiforme sulcatum truncatum circ. 3 mm. longum dense lepidotum; stylus clavatus brevis crassus glaber; stigma lobulatum. Species *Rh. brachyantho,* Franch. affinis.

W.N.-W.-Yunnan. Mt. Sela. Soulié No. **1027.**

W.N.-W.-Yunnan. Mekong-Salween divide. N.W. of Tzeku. Lat. 28° 15′ N. Alt. 13,000 ft. Dry open situations in pine forests. Forrest No. **692.** July 1904.

W.N.-W.-Yunnan. Mekong-Salween divide. Lat. 28° 10′ N. Alt. 12,000 ft. Amongst open scrub and on the margins of thickets and pine forests. Shrub of 3 4 ft. in fruit. Forrest No. **13,302.** Sept. 1914.

W.N.-W.-Yunnan. Mekong-Salween divide. Lat. 28° 10′ N. Alt. 11,000 ft. In open scrub. Shrub of 5 ft. Flowers yellow. Forrest No. **13,550.** Oct. 1914.

W.N.-W.-Yunnan. Mekong-Salween. Lat. 28° 20′ N. Alt. 11–13,000 ft. Amongst boulders and scrub and on cliffs. Shrub of 2 4 ft. Flowers dull yellow. Foliage strongly aromatic. Forrest No. **14,052.** June 1917.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. On cliffs and rocky slopes. Forrest No. **19,190.** July 1919.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. Strongly aromatic shrub of 3 ft. Flowers dull olive-yellow. On boulders and cliffs. Forrest No. **19,198.** Aug. 1919.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat.

28° 40′ N. Long. 98° 15′ E. Shrub of 1–2 ft. Amongst rocks in ravines. Forrest No. **19,207.** July 1919.

S.E. Tibet. Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. Shrub of 3–5 ft. On open alpine meadows. Forrest No. **19,216.** Aug. 1919.

N.E. Upper Burma. Chawchi Pass. Alt. 10–11,000 ft. A little thin bush of 15–24 inches. Epiphytic in the upper alpine woodland. Flowers white fairly pretty and sweet. Plant strongly aromatic. Flowering season mid-July. Farrer No. **1668.**

Franchet separated from Delavay's Tali plant—*Rh. brachyanthum*, Franch.—this Mekong-Salween plant of Soulié as a variety under the name of var. *hypolepidotum*. The two plants differ more than is conveyed by this degree of segregation and here we read for *Rh. hypolepidotum* a definite specific position :—a coarser plant in vegetative features it is, with larger and stiffer leaves. The covering of discontiguous scales of the under surface is present in both but in *Rh. brachyanthum* the scales are but 2–3 in a square millimeter, in *Rh. hypolepidotum* as many as 6–7. The flower characters though much alike differ in small points such as—the calyx is not so grey with wax, the stamens are much thinner and more villous, the style is shorter than stamens.

3964 **Rhododendron hypotrichotum,** Balf. f. et Forrest.

Frutex ad 1 m. altus. Ramuli tenues hornotini circ. 1 mm. diam. pilis minutis erectis dense puberuli elepidoti vel rarissime squamas sparsas exhibentes, annotini circ. 2 mm. diam. indumento simili vestiti. Folia petiolata ad 5.5 cm. longa aromatica; lamina papyracea anguste oblongo-ovalis a basi latiore sursum gradatim attenuata ad 4.5 cm. longa 2 cm. lata, ad apicem acutum angustata mucrone rubro tuberculato terminata, margine paullo recurva, basi rotundata; supra opaca atro-olivacea subreticulata elepidota, costa media demum erubescente puberula, venis primariis utrinsecus circ. 8 pinnatim adscentibus paullo elevatis; subtus pallide viridis remote lepidota, intervallis laete viridibus diametrum squamarum superantibus squamis impressis disciformibus discontiguis (in quoque mm. quad. 3–4) rubiginosis instita fere nulla, costa media farina rubra deinde flavida basim versus puberula, venis primariis occultis; petiolus circ. 1 cm. longus rubidus sulcatus ut ramuli vestitus. Flores in umbellas 4-floras terminales dispositi, bracteae bracteolaeque mox deciduae; pedicelli ad 1.2 cm. longi glabri sub calyce dilatati. Calyx parvus cupuliformis ad 1.5 mm. longus 5-lobus; cupula glabra vel squamis sparsis nunc praedita; lobi rotundati vel semilunati margine dense regulariter squamo-cincti. Corolla lavandulaceo-rosea maculis paucis ornata ad 3 cm. longa campanulata extus

glabra intus pubescens; tubus latus in limbum 5-lobum late patentem ampliatus; lobi rotundati circ. 2 cm. longi 1.5 cm. lati. Stamina 10 inaequalia corolla paullo breviora; filamenta basim versus villosa. Discus puberulus. Gynaeceum corolla paullo longius; ovarium conoideum truncatum lepidotum sed squamis inaequaliter dispersis; stylus glaber sub stigmate latiore lobulato haud dilatatus. Species phyli *Rh. triflori*, Hook. f. in Serie Trifloro.

S.E. Tibet: Tsarong. Mekong-Saween divide. 10 11,000 ft. Forrest **16,543.** June 1918.

Most distinct in Triflorum Series (phylum Triflorum) by its aromatic leaves and midrib puberulous below. Has puberulous twigs without scales, narrow leaves small relatively, petiole puberulous and also usually elepidote, lamina with midrib above and below puberulous towards base. Pedicels glabrous. Calyx glabrous save for corona round edge of lobes. Corolla with broad short tube. Note warting by disease common on outside of corolla, might be taken at first for peltate scales. Corolla is glabrous outside and hairy inside. Ovary has scales irregularly placed leaving areas bare.

Rhododendron intortum, Balf. f. et Forrest.

Frutex vix 3 m. altus durus. Rami rigidi crassi incrementis annuis brevibus, annotini circ. 4 mm. diam. tomenti vestigiis siccis scariosis griseis induti, seniores ubique mycelio nigro fungali infesti. Alabastra ovoidea ad maturitatem circ. 1.5 cm. longa 7 mm. lata; perulae extimae crustaceae rotundatae longe apiculatae 1 cm. longae extus tomentosae, intermediae oblongo-ovales mucronulatae molliter tomentosae. Folia petiolata ad 10 cm. longa; lamina crasse coriacea rigida ovalis vel oblongo-ovalis vel obovalis ad 8.5 cm. longa 4 cm. lata subrostratim breviter acuminata mucrone parvo, margine plana, basi late obtusa nunc vix rotundata; supra plus minusve fusca opaca in modum squali corii rugulosa pilis vestigialibus plus minusve notata sed glabrescens, costa media sulcata pilis marcidis impleta, venis primariis utrinsecus circ. ad 16 paullo impressis; subtus helvola indumento persistente coactili bistrato subscintillante omnino obtecta, indumenti pilis vesiculosis rosulatis longis et brevibus adpressis et in superficiem laevem demum pelliculiformem subagglutinatis; petiolus crassus ad 1.5 cm. longus ut rami tomentosus. Gemmae florales subglobosae 1 cm. diam. Flores in racemo-umbellas plurifloras dispositi, rhachi circ. 1.5 cm. longa floccosa; bracteae intimae sericeae; pedicelli circ. 1 cm. longi floccosi. Calyx parvus circ. 1.5 mm. longus cupuliformis carnosulus ad medium 5-lobus; lobi late triangulares ciliati. Corolla alba roseo-suffusa maculis paucis kermesinis notata campanulata zygomorpha sub-

nutans circ. 3 cm. longa genitalia includens basi carnosula subgibbosa, extus glabra intus puberula ; lobi 5 rotundati emarginati circ. 1.2 cm. longi fere 2 cm. lati. Stamina 10 brevia inaequalia, longiora circ. 1.7 cm. longa breviora circ. 8 mm. ; filamenta puberula. Discus glaber. Gynaeceum breve circ. 2 cm. longum ; ovarium subcylindricum truncatum sulcatum circ. 4 mm. longum glaberrimum ; stylus glaber subcrassus vix sub stigmate lobulato expansus.

Western N.W. Yunnan. Mekong-Salween divide. Lat. 28° N. 12,000 ft. Margins of rhododendron and pine forests. Shrub of 6-9 ft. Flowers white flushed rose with few crimson markings. Forrest **16,303.** May 1918.

Fine species. Wants the vandyke-brown upper surface of leaves in *Rh. sigillatum* and the leaves are more oboval and much more rigid and acuminately pointed. Indumentum hairs below are not quite the same, the larger are fewer, the whole deliquesces at first and then gets into an adpressed pellicle. Calyx very different.

Rhododendron ioanthum, Balf. f.

Frutex ad 1 m. altus. Ramuli stricti, annotini circ. 2 mm. diam. purpurei lepidoti et minutissime puberuli, seniores verruculosi. Folia petiolata ad 7.5 cm. longa ; lamina crasse coriacea rigida oblongo-ovalis ad 6 cm. longa 2.5 cm. lata (in speciminibus siccis ; fortasse folia multo majora sunt si descriptio "à grandes feuilles" cl. Mairei recta est), sursum acuminatim attenuata hydathodo rubro apiculato terminata, margine cartilaginea subcordulata et crenis minutis notata, basi rotundata vel obtusa ; supra olivacea opaca granulosa squamis marcidis indistincte induta, costa media erubescente sulcata puberula, venis primariis utrinsecus ad 9 vix elevatis ; subtus pallide fusca papillis epidermicis glaucis ceriferis tecta et squamis rufescentibus late discontiguis subimpressis vestita, squamarum diametro intervalla excedente, squamis ipsis peziziformibus latis subaequalibus umbonis annulo resinoso-infiltrato et instita lata membranacea fusca notatis, costa media elevata lepidota erubescente, venis primariis occultis ; petiolus circ. 1.5 cm. longus rubescens sulcatus sulco puberulo caeteroquin ut ramuli lepidotus. Flores in umbellas 3 4-floras ad apicem ramorum fasciculatas dispositi ; bracteae plus minusve persistentes exteriores crustaceae rotundatae vel ovatae dorso lepidotae margine breviter albido-ciliatae ; bracteolae filiformes ad 1.7 cm. longae a basi pilosae superne lepidotae ; pedicelli breves vix 1 cm. longi dense lepidoti. Calyx parvus cupuliformis 5-lobatus 1.5 mm. longus extus dense lepidotus ; lobi triangulari-deltoidei cupulam aequantes squamo-fimbriati et minute ciliati.

Corolla caerulea emaculata circ. 2.5 cm. longa subzygomorpha a tubo lato brevi haud sulcato sursum in limbum explanatum ampliata extus lepidota epilosa intus puberula; lobi rotundati vel elliptici ad 1.5 cm. longi. Stamina 10 inaequalia, longiora circ. 2.5 cm. longa corollam aequantia antheris purpureis oblongis circ. 2.5 mm. longis, breviora circ. 1.5 cm. longa antheris globosis circ. 1 mm. diam.; filamenta deorsum paullo dilatata basi nuda sursum intra tubum corollinum dense puberula. Discus puberulus. Gynaeceum 3.2 cm. longum corollam staminaque superans; ovarium circ. 4 mm. longum paullo sulcatum truncatum dense lepidotum; stylus glaber sub stigmate lobulato labiatim expansus. Species in Serie Trifloro, phyli *Rh. siderophylli*.

Central Yunnan: Io-chow. Alt. 3200 m. Maire **51** 1914. (Herb. Edin.)

One of the Siderophyllum phylum. Distinguished by the puberulous petioles, the midrib puberulous above, and by the corolla puberulous inside.

I think here come also Maire **1105** (Herb. Edin.). Probably also Maire **43**/1914 (Herb. Edin.) and Maire **44** 1914 (Herb. Edin.)

Rhododendron jangtzowense, Balf. f. et Forrest.

Frutex ad 3 m. altus durus rigide ramosus. Rami annotini circ. 4 mm. diam. indumento sublanato denso primo albido dein cinereo vestiti. Perulae fugitivae. Folia petiolata ad 10 cm. longa; lamina crasse coriacea obovalis vel oblongo-ovalis ad 8.5 cm. longa 3 cm. lata, apice rotundata breviter tuberculato-mucronata, margine cartilaginea paullo recurva, basi obtusa vel rotundata nunc subcordulata; supra pallide viridis glabra (in juventute sparsim floccosa), costa media sulcata, venis primariis utrinsecus ad 12 paullo impressis; subtus indumento denso persistente bistrato—strati superi pilis longe stipitatis in ramos plurimos radiantes deliquescentibus et stratum inferum pilorum rosulatorum breviter ramosorum laxe obtegentibus—primo albido ut videtur vestita sed specimina nostra omnia mycophyllon aedificantia fuliginosa sunt, costa media erubescente sparsissime floccosa; petiolus ad 1.5 cm. longus purpurascens ut rami vestitus. Flores in umbellas circ. 4-floras dispositi; pedicelli dense floccoso-lanati subglutinosi circ. 1.5 cm. longi. Calyx magnus foliaceus conspicue zygomorphus fere 2 cm. longus; cupula parva 1–2 mm. longa; limbus flavidus membranaceus irregulariter 5-lobatus; lobi nunc dentati, postici majores, antici nunc 3 mm. longi, glabri vel sparsim floccosi post fecundationem delapsi. Corolla intense rosea tubuloso-campanulata 4.5 cm. longa septis incompletis praedita et basi gibbosa sacculis atro-kermesinis; lobi rotundati

1.2 cm. longi 1.5 cm. lati. Stamina 10 longiora circ. 3.2 cm. longa; filamenta puberula. Discus glaber. Gynaeceum circ. 3.7 cm. longum; ovarium circ. 6 mm. longum truncatum pilis fasciatis curvatis siccis dense tomentosum; stylus validus nudus; stigma parvum.

Western Yunnan. Shweli-Salween divide. Towards the summit of Jangtzow Shan. Lat. 25° 10′ N. On cliffs and bouldery slopes. Shrub of 2½–3½ ft. Flowers including calyx deep rose flushed orange margins to purplish rose at apex especially in bud. Forrest No. **18,167.** June 1919.

One of the Sanguineum Series of Rhododendrons and of that series which has the squat tomentose truncate ovary. It is an eglandular form. Its features reflect strongly its habitat. One recognises it at once as a plant of exposed windy and probably sunny situations—a fully equipped xerophyte. It has also a mycophyllon well-developed—every leaf is one—but dissection shows the true indumental hairs embedded in the black fungal mycelium.

Rhododendron lampropeplum, Balf. f. et Forrest.

Frutex vix 1 m. altus. Rami subcrassi circ. 4 mm. diam. incrementa annua brevissima exhibentes indumento rufo-lanato persistente induti per annos 3–4 perulati postea nudi. Alabastra oblonga circ. 1.2 cm. longa; perulae exteriores coriaceae vel sublignosae a basi sublanceolatae vel anguste ovatae dein ovatae carinatae mucronulatae plus minusve rufo-tomentosae et ciliatae glandulis rubris etiam dorso conspersae, intimae membranaceae ligulatae acutae circ. 1.5 cm. longae 2 mm. latae. Folia petiolata concava ad 4.5 cm. longa; lamina crasse coriacea rigida oblonga vel oblongo-ovalis vel obovalis apice obtusa mucrone tuberculato recurvo inconspicuo, margine recurva, basi subrotundata; supra laete viridis opaca in modum squali corii rugulosa glabrescens pilis vestigialibus rufis hic et illic notata (costa media pilis impleta excepta) venis primariis utrinsecus circ. 8 vix impressis; subtus subcoccineo-rubra indumento lanato bistrato persistente ex toto obtecta, strati superi pilis coloratis longi-ramosis complanatis intertextis superficiem sublaxam exhibentibus, strati inferi rosulatis paucioribus ecoloratis breviter ramosis in pelliculam haud agglutinatis, costa media basi et ultra plus minusve elevata; petiolus circ. 8 mm. longus 2 mm. latus ut rami vestitus. Gemmae florales globosae magnae. Flores in umbellas plurifloras parvas compactas dispositi; bracteae intimae obovato-spathulatae dorso albido-sericeae margine rufo-ciliatae; bracteolae filiformes circ. 6 mm. longae pilosae et pilis albidis cristatae; pedicelli circ. 1 cm. longi haud expansi tenuiter pubescentes eglandulosi. Calyx parvus circ. 1.5 mm. longus carnosulus in lobos 5 del-

toideos cupulam glabram aequantes pilocristatos divisus. Corolla alba leviter roseo-suffusa kermesino-maculata et forsan varo postico basim versus notata infundibuliformis circ. 3 cm.longa extus glabra intus puberula basi subgibbosa; lobi rotundati emarginati circ. 1.2 cm. longi 1.8 cm. lati. Stamina 10 circa stylum aggregata inaequalia gynaeceo breviora, longiora circ. 1.7 cm. longa breviora circ. 1 cm.; filamenta deorsum complanata pilis longis patentibus villosa. Discus puberulus. Gynaeceum circ. 2 cm. longum corolla multo brevius; ovarium ovoideum truncatum sulcatum circ. 3 mm. longum glabrum; stylus validus sub stigmate lobulato paullo expansus. Species Seriei Roxieani.

S.W. Szechwan. Mu-li Mts. Lat. 28° 12′ N. 12–14,000 ft. Open rocky pasture and on cliffs. Shrub of 2–3 ft. Flowers white faintly flushed rose with crimson markings. Forrest No. **16,509.** June 1918.

The particular point distinguishing this species from *Rh. proteoides* is the glabrous ovary. The pedicels only pubescent not pink tomentose, Then the leaves are broader, have narrower petioles and the lamina rounded at base. Altogether very different.

3833 **Rhododendron leilungense,** Balf. f. et Forrest.

Frutex ad 1 m. altus tortuose ramosus. Rami annotini tenues circ. 1.5 mm. diam epilosi squamulis peltatis parvis breviter stipitatis brunneis subresinosis vestiti. Alabastra ovoidea minuta lepidota. Folia petiolata ad 3.5 cm. longa; lamina rigide coriacea ovalis vel ovali-elliptica ad 3 cm. longa 1.8 cm. lata, obtusa mucronulata, margine paullo recurva subundulata, basi late obtusa; supra griseo-viridis nitida venuloso-reticulata (sicca) squamis peltatis obscuris distantibus conspersa, costa media puberula venisque primariis utrinsecus ad 8 paullo elevatis; subtus pallidior subglauca vel leviter fulvo-tincta superficiem laevem glauco-albam epilosam papillas epidermicas ceriferas gerentem et ubique squamis impressis uniformibus (circ. 15 intra 1 mm. quadr.) brunneis discontigue lepidotam (squamis intervallisque fere aequilatis) exhibens, costa media elevata flavida plus minusve lepidota, venis primariis vix conspicuis; petiolus circ. 5 mm. longus ut rami annotini vestitus. Inflorescentia pauciflora (1–3-) umbellata; bracteae extimae crustaceae rotundatae margine albo-ciliatae, intimae obovatae truncatae submembranaceae circ. 8 mm. longae 5 mm. latae extus lepidotae intus superne sericeae; bracteolae circ. 8 mm. longae clavatae pilosulae; pedicelli circ. 8 mm. longi (sub fructu 1 cm.) furfuraceo-lepidoti sub calyce expansi. Calyx cupuliformis circ. 1.5 mm. longa; cupula dense lepidota margine undulata submembranacea minutissime ciliata et lepidota. Corolla infundibuliformis circ. 2 cm.

longa pallide rosea subzygomorpha extus sparsim scintillantim lepidota intus puberula; lobi 5 subaequales subovales circ. 1 cm. longi 8 mm. lati. Stamina 10 inaequalia, longiora corolla breviora; filamenta paullo puberula; antherae roseae. Discus glaber. Gynaeceum stamina longiora aequans; ovarium conoideum truncatum lepidotum; stylus glaber sub stigmate expansus. Species Seriei Triflori.

Eastern N.W. Yunnan. Lei-lung-shan. 9000 ft. Forrest No. **15,208.** July 1917.

4258 **Rhododendron liratum**, Balf. f. et Forrest.

Fruticulus vix .5 m. altus tortuosus durus pauci-ramosus. Rami tenues circ. 1.5 mm. diam. in juventute pilis recurvis albis adpressis arachnoideis in formam indumenti vestiti, vetustiores vestigialiter induti. Folia parva petiolata circ. 5.5 cm. longa; lamina crasse coriacea rigida ovalis vel oblongo-ovalis vix obovalis ad 5 cm. longa 2 cm. lata, apice obtusa vel subrotundata rostrato-mucronata, margine cartilaginea recurva, basi obtusa nunc subauriculata; supra viridis plerumque purpurascens glabra (in juventute floccosa) costa media anguste sulcata, venis primariis obscuris, jugis prominulis circ. 6 longitudinaliter traversa; subtus flavida pilis albis arachnoideis adpressis indumenti incompleti pruinosim conspersa, et sulcis juga superficiei superioris ingeminantibus percursa, costa media elevata indumenti vestigiis plus minusve praedita, venis primariis occultis; petiolus circ. 5 mm. longus dense tomentosus. Flores in umbellis 1-2-floris; pedicelli circ. 1 cm. longi pilis adpressis dense pubescentes. Calyx ad 1.2 cm. longus; cupula parva in limbum coloratum membranaceum inaequaliter 5-lobatum expansa; lobi primo erecti glabri sed margine ciliati demum deflexi et cum corolla abjecti. Corolla parva roseo-coccinea tubuloso-campanulata circ. 2.5 cm. longa basi gibbosa; lobi circ. 8 mm. longi 1.1 cm. lati. Stamina paullo inaequalia corollam gynaeceumque subaequantia; filamenta glabra. Discus sparsim puberulus. Gynaeceum corollam subaequans; ovarium 5 mm. longum conoideum truncatum pilis fasciatis plurimis et glandulis setulosis paucis vestitum; stylus glaber; stigma parvum. Species Seriei Sanguinei *Rh. apodecto*, Balf. f. et W. W. Sm. affinis.

Western Yunnan: Shweli-Salween divide. Jangtzow Shan. Alt. 11,000 ft. Lat. 25° 10′ N. On cliffs and bouldery slopes near the summit. Contorted shrub 1½–2 ft. Flowers rose-carmine. Forrest No. **18,153.** June 1919.

A very rigid hard plant evidently of exposed habitats with bright flowers few in number. Easily distinguished from *Rh. apodectum*, its nearest ally, by the small leaves with detersile indumentum, the small few flowers, the glabrous stamens.

Rhododendron lithophilum, Balf. f. et Ward.

Frutex nanus vix 1 m. altus. Rami tenues esetulosi, juveniles ad 1.5 mm. diam. purpurei sparsissime lepidoti. Folia cum floribus coaetanea petiolata ad 3.5 cm. longa; lamina papyracea obovalis ad 3.1 cm. longa 1.1 cm. lata, apice rotundata saepe retusa tuberculato-mucronulata, margine cartilaginea subplana saepe rubida et obscure undulata setulis tenuibus paucis detersilibus ornata, basi in petiolum attenuata; supra (in speciminibus nostris) atro-brunnea glabra, costa media haud sulcata; subtus pallidior squamis inter se 1 mm. distantibus conspersa epilosa nunc setula sporadica praedita, costa media rubra elevata sparsissime lepidota, venis primariis utrinsecus ad 8 rubris; petiolus circ. 4 mm. longus sparsim lepidotus nunc sparsim setulosus. Umbellae 2 4-florae terminales; pedicelli breves circ. 1 cm. longi purpurei esetulosi sparsim lepidoti sub calyce incrassati. Calyx minutus circ. 1.5 mm. longus; cupula glabra; lobi membranacei elepidoti margine setulosi. Corolla pallide sulfurea maculata infundibuliformis obliqua circ. 1.8 cm. longa extus lepidota epilosa intus puberula; lobi 5 rotundati vel oblongo-ovales venulosi circ. 7 mm. longi 9 mm. lati integri. Stamina 10 inaequalia corolla breviora, longiora ad 1.3 cm. longa breviora circ. 9 mm. Discus glaber. Gynaeceum corolla brevius ad 1.4 cm. longum; ovarium conoideum sulcatum truncatum dense lepidotum; stylus rectus tenuis glaber sub stigmate lobulato haud incrassatus. Species Seriei Trichocladi.

N.E. Burma: Western spur of Imaw Bum. Alt. 12,000 ft. Dwarf shrub of 2–3 feet amongst large granite boulders in bamboo thickets, S.-facing slopes. Flowers pale sulphur yellow, leaves thin and membranous more or less bordered with red. Not common. (cf. 3097.) Kingdon Ward No. **3303.** 2.7.19.

A species of the Trichocladum Series distinguished by its foliage, its general want of bristles, its usually glabrous pedicels and its very small calyx.

Rhododendron manopeplum, Balf. f. et Forrest.

Frutex pauci-ramosus. Rami stricti divaricati, hornotini sparsissime rubro-glandulosi glandulis breviter stipitatis, annotini glabri circ. 3 mm. diam. Folia breviter petiolata ad 10 cm. longa; lamina coriacea oblongo-ovalis ad 8.5 cm. longa 4.5 cm. lata, apice paullo angustata subrostratim mucronata, basi rotundata cordulata; supra juventute sparsim rubro-glandulosa et floccosa maturitate glabra olivacea et purpurascens, costa media sulcata plus minusve flava traversa; subtus pallide fulva velo indumentali e pilis sebaceis ramosis aedificato obtecta et prope costam mediam flavam elevatam basim versus pinguem sursum mox

attenuatam glandulis rubris praedita, venis primariis paullo elevatis; petiolus 1 1.5 cm. longus flavus glaber vel glandularum vestigiis paucis notatus. Flores in racemo-umbellam circ. 8-floram dispositi, rhachi glabra circ. 1 cm. longa; pedicelli circ. 1 cm. longi tenues parcissime glandulosi sub calyce oblique ampliati. Calyx parvus circ. 3 mm. longus carnosulus kermesinus glandulosus 5-lobus; lobi rotundati glanduloso-ciliati. Corolla maculata circ. 4.5 cm. longa subaperto-campanulata intus sparsim puberula; lobi 5 rotundati lati emarginati circ. 1.7 cm. longi 2.2 cm. lati late patentes. Stamina 10 inaequalia, longiora circ. 2.3 cm. longa breviora 1.3; filamenta conspicue puberula. Discus ad juga puberulus. Gynaeceum circ. 3 cm. longum; ovarium tenue 6 mm. longum glandulis rubris breviter stipitatis indutum; stylus basi glandulosus; stigma discoideum.

S.E. Tibet. Tsarong, Forrest No. **18,654.** 1917.

A remarkable species really of the Dasycladum Series but simulating in vegetative form and grosser flower characters *Rh. glaucoblastum*, Balf. f. et Forrest of the Souliei Series. It is readily distinguished amongst its allies of which perhaps *Rh. truncatulum*, Balf. f. et Forrest is the nearest by the marked thin indumental veil of yellow branched sebaceous hairs covering the underleaf surface.

Rhododendron myrtilloides, Balf. f. et Ward.

Fruticulus humilis habitum ericoideum proponens. Rami perulati decumbentes saepe subdiffusi et laxe patentes, annotini elongati a basi foliis vestiti circ. 1 mm. diam. squamis magnis furfuraceis dense lepidoti deinde tuberculati. Folia petiolata ad 2.4 cm. longa; lamina crasse coriacea anguste obovata vel obcuneata ad 2 cm. longa 6 mm. lata, apice rotundata breviter tuberculatim mucronata, margine leviter recurva obscure crenulata crenarum sinu squama notato, basi tenuiter in petiolum attenuata; supra olivacea squamis vestigialibus discontiguis (in quoque quadr. circ. 5) induta; subtus albido-grisea (postea nunc brunnea) papillis epidermicis ceriferis omnino tecta et squamis discontiguis (in quoque quadr. mm. 5–6) punctulata, costa media elevata straminea lepidota; petiolus tenuis ad 4 mm. longus ut rami vestitus. Flores solitarii vel bini longe pedicellati terminales; bracteae sub anthesi deciduae; pedicelli stricti erecti ad 4 cm. longi purpurei sparsim lepidoti apice ampliati. Flos subsecundus. Calyx parvus circ. 4 mm. longus 5-partitus; cupula extus lepidota; lobi subvirides late ovati vel rotundati glabri nunc sparsim lepidoti. Corolla late infundibuliformis circ. 1.5 cm. longa pruni colore tincta subcarnosula basi subgibbosa extus glabra intus minutissime puberula; lobi 5 oblongo-ovales integri

circ. 7 mm. longi 5 mm. lati subpatentes. Stamina 8, 2-verticillata corolla breviora, 4 longiora circ. 1.1 cm. longa, 4 breviora 9 mm.; filamenta carnosula leviter complanata deorsum latiora fere ad apicem breviter puberula; antherae albidae. Discus puberulus. Gynaeceum corolla multo longius ad 2 cm. longum longe exsertum; ovarium conoideum sulcatum truncatum lepidotum circ. 3 mm. longum; stylus coloratus validus basi sparsim lepidotus leviter curvatus et deorsum subinflexus; stigma lobulatum. Species Seriei Campylogyni.

N.E. Burma. Ridge of Naung-Chaung in Nmai divide. Dwarf of two or three inches growing in masses on the granite cliffs generally in moss. Open damp situations. Flowers plum-coloured outside, maroon-coloured inside. Cf. black rhododendron from Ka-gwr-pw [*Rh. damascenum*]. 15,000 ft. Kingdon Ward No. **1785.** 15 July 1914.

N.E. Burma. Valley of the Chaung-maw-tka. Alt. 8000 ft. Forms heath-like masses on slaty rocks in the open river bed. Flowers plum-coloured. Anthers white. Just coming into flower. Flowers July to August. Kingdon Ward No. **3172.** 4 June 1919.

N.E. Burma. Hpimaw Ridge. Alt. 12 12,600 ft. In all the granitic clefts and cliffs of the highest open tops. Flowers waxy with a deep plum-like bloom outside and inside of a hot mahogany red—very delicate and attractive. Farrer **1046.** June 24, 1919.

A form showing very grey-white underleaf surface due to the wax-secreting epidermal papillae and the surface is punctulate by discontiguous scales in a manner different from that of other forms in the series. The leaves are narrower than in most of the species and then separating it from its near allies is its long exserted style.

Rhododendron niphobolum, Balf. f. et Farrer.

Arbor. Rami contorti paucifolii primo purpurei glabri? dein brunnei demum albi glabri, annotini circ. 3 mm. diam. Alabastra elongato-ovoidea; perulae extimae rotundatae apiculatae dorso glabrae albo-ciliatae. Folia petiolata ad 9 cm. longa; lamina coriacea ovalis ad 8 cm. longa 4 cm. lata, apice rotundata rostratim apiculata mucrone terminata, margine cartilaginea, basi late rotundata vel subcordulata; supra atro-viridis quasi cerifera glauca glabra, costa media sulcata rubida, venis primariis circ. 10 paullo impressis rubidis; subtus fulva costa media elevata glabra erubescente (venis primariis occultis), superficie caeteroquin minute reticulata papillis epidermicis longis baculiformibus rectis et indumento tenui detersili e pilis breviter rubrostipitatis radiatim ramosis (pedibus rubris pilorum delapsorum

laminas vetustiores punctulatim notantibus) obtecta; petiolus circ. 1 cm. longus glaber. Umbella 4-flora?; bracteolae filiformes circ. 7 mm. longae fere ad apicem glabrae ibique pilis paucis adpressis praeditae; pedicelli 1 cm. longi glabri. Calyx 5 mm. longus ubique glaber cupularis; cupula basi atro-kermesina sursum in limbum membranaceum ochraceum 5-lobum ampliata; lobi rotundati inaequales posticis maximis circ. 3 mm. longis. Corolla kermesina maculata evariculata zygomorpho-campanulata postice circ. 4.5 cm. longa antice 4 cm. extus intusque glabra basi gibbosa et septis incompletis notata 5-loba; lobi rotundati emarginati 1.5 cm. longi 2 cm. lati. Stamina 10 inaequalia circum stylum aggregata, longiora 3.5 cm. longa breviora 2.5 cm.; filamenta puberula. Discus glaber. Gynaeceum 3.5 cm. longum stamina longiora aequans; ovarium circ. 4.5 mm. longum conoideum sulcatum truncatum ad juga sparsim glandulosum, glandulis aurantiacis ovoideis subsessilibus; stylus tenuis glaber; stigma parvum styli diametro minus. Species Seriei Thomsoni, Phyli Eclectei.

N.E. Upper Burma. Chawchi Pass, etc. Alt. 10,500 ft. A smaller tree than the last [presumably 1551] in full blossom amid the snow. Flowers very copious but of a virulent blue-magenta like *Rh. fastuosum* fl. pl. Though much like this some of its tones are less displeasing than others. Nos. 1549, 1551, 1552 make up the spring flowering Rhododendron forest at 10,500 ft. F. 1552 is particularly abundant and copious just now among the snow at 10,500 ft. Farrer No. **1552**B. May 15, 1920.

Also in miles of colour in the open on the Maguchi Pass. June 1.

Specimens of this very distinct plant were found in the cover along with those of *Rh. chawchiense* under No. 1552. There is no means by which one can say to which set of specimens the ticket refers. I have numbered this specimen 1552B and those of *Rh. chawchiense* 1552A.

Rhododendron obscurum, Franch. ex scheda.

Frutex ad 2.5 m. altus. Ramuli virgati, annotini circ. 2 mm. diam. purpurei epilosi squamis ferrugineis subcarnosulis dense leprosi, seniores verruculosi. Alabastra parva ovoidea. Folia epilosa petiolata ad 9.5 cm. longa; lamina crasse coriacea rigida oblonga vel oblongo-ovalis vel subovalis vel sublanceolata nunc curvata 8.5 cm. longa 2.5 cm. lata, sursum acuminatim attenuata mucrone conspicuo terminata, margine anguste cartilaginea paullo recurva, basi obtusa; supra fulvo-olivacea subnitida laevis squamis distantibus peltatis subimpressis marcidis inconspicuis notata, costa media paullo sulcata erubescente, venis primariis utrinsecus circ. 8–10

paullo elevatis; subtus cervina reticulata copiose discontigue lepidota intervallis squamarum diametrum superantibus, squamis in quoque quad. mm. circ. 4–5 dispositis ex umbone convexo rufescente et instita latiore membranacea incolorata aedificatis, costa media elevata erubescente lepidota, venis primariis paullo elevatis; petiolus 1 cm. longus vel ultra rubidus sulcatus ut ramuli vestitus. Flores in umbellas 5-floras solitarias et terminales vel 2–3-fasciculatas dispositi; bracteae plus minusve sub anthesi persistentes exteriores crustaceae late ovatae dorso lepidotae breviter albo-ciliatae, interiores membranaceae obovatae spathulatae truncatae dorso sericeae et lepidotae ad 1.5 cm. longae 6 mm. latae; bracteolae lineares circ. 1.5 cm. longae superne latiores pilosae et lepidotae apice barbatae; pedicelli circ. 1.5 cm. longi dense lepidoti. Calyx parvus cupuliformis circ. 1.5 mm. longus extus dense lepidotus margine irregulariter indistincte lobatus. Corolla subzygomorpha infundibuliformi-campanulata ad 2.5 cm. longa purpureo-rosea postice maculata intus glabra extus squamis flavidis et kermesinis copiose lepidota; tubus limbum ascendentem 5-lobum subaequans basi intensius colorata; lobi ovales. Stamina 10 inaequalia, longiora corollam subaequantia breviora circ. 1.7 cm. longa; filamenta glabra nunc obscure puberula sed filamentum posticum dense puberulum. Discus puberulus. Gynaeceum circ. 3 cm. longum corollam superans; ovarium circ. 4 mm. longum angustum conoideum truncatum paullo sulcatum dense lepidotum; stylus glaber sub stigmate discoideo latiore lobulato dilatatus. Species Seriei Triflori, phyli *Rh. siderophylli*.

Eastern Yunnan. Prope Yunnansen. Secus viam. Bas Yunnan. Anne forma *Rh. racemosae*? Delavay. 4 Mart. 1891.

S.E. Yunnan. In Imen district. Whitish to violet flowers. Henry **9110**A.

S.E. Yunnan. Dry wooded hills N. of Ten-Hsiong-fu valley. Lat. 25° 6′ N. Alt. 6–7000 ft. Forrest No. **507.** Feb. 1905.

S.E. Yunnan. About Yunnanfu. Maire **2696** (Herb. Edin.)

The fewer scales of the indumentum separate this from *Rh. siderophyllum*, Franch. Hemsley has written on the sheet from Paris now in Kew Herbarium the following flower analysis :— "Stamens shorter than corolla. Filaments glabrous." On the sheet of Henry's collecting Hemsley has "pub. stam." This seems to be one of those forms in Rhododendron where there is this variation. In the Triflorum Series it often happens that the posterior short stamens are quite densely hairy, the anterior long ones only faintly hairy or with no hairs. In every one of the members of the Trichocladum Series there is this difference in the androecium on the anterior and posterior side respectively of the flower. The difference is only seen in flowers which are **medianly zygomorphous.**

Rhododendron ombrochares, Balf. f. et Ward.

Arbor parva. Rami hornotini albido-tomentosi pilis floccosis sebaceis detersilibus dense vestiti, annotini ad 4 mm. diam. glabri vel indumenti vestigiis notati. Folia petiolata ad 16 cm. longa; lamina coriacea subrigida lanceolata vel ovali-lanceolata ad 14 cm. longa 4.5 cm. lata, apice rostrato-acuminata mucrone hemisphaerico ad superficiem superiorem sessili, margine cartilaginea obscure undulata et asperata, basi attenuata cuneata; utrinque glaberrima sed in alabastris superficies superior dense sebaceo-tomentosa est, inferior glandulis conspersa et ad costam mediam tomentosa; supra glauco-viridis vel olivacea, costa media sulcata, venis primariis utrinsecus ad 21 pinnatim patentibus impressis; subtus fulvido-viridis venarum omnium prominularum distributione spinas costasque animalium simulante, superficie sine papillis ceriferis sed pedibus glandularum rubro-punctulata; petiolus circ. 2 cm. longus supra sulcatus ut rami vestitus. Flores racemo-umbellae cujusque 6 laxe dispositi inflorescentiae rhachi ad 3 cm. longa tomento tenui albido induta; bracteae interiores obovatae 2 cm. longae 1 cm. latae dense albo-sericeae; bracteolae circ. 1 cm. longae lineares acutae a basi pilosae pilo-cristatae; pedicelli vix 1 cm. longi sparsim rubro-glandulosi glandulis brevibus. Calyx parvus circ. 1 mm. longus carnosulus 5-lobus glaber. Corolla tubuloso-campanulata carnosula kermesina et maculis lineisque curvatis intensioribus notata 4 cm. vel ultra longa basi gibbosa sacculis intense atro-kermesinis et septis incompletis parvis praedita, extus intusque glabra; lobi 5 sed nunc 4 rotundati 1.8 cm. longi 2 cm. lati. Stamina 10 inaequalia corolla gynaeceoque breviora, longiora circ. 3.5 cm. longa breviora 2 cm.; filamenta minute puberula. Discus minute puberulus. Gynaeceum corollam aequans; ovarium circ. 7 mm. longum cylindrico-conoideum sulcatum truncatum ad juga setuloso-glandulosum in sulcis sebaceo-floccosum; stylus longus glaber; stigma lobulatum stylo paullo latius. Species Seriei Irrorati.

N.E. Upper Burma. Laktang. Lat. 26° 10′ N. Long 98° 30′ E. Alt. 8,000 ft. Big tree of 40 ft. in the lower forest—the first Rhododendron met with. Flowers rich crimson with a few darker spots especially on the upper petals. Honey-glands at base of corolla almost black. F. Kingdon Ward No. **3041.** 20th May, 1919.

3rd July, 1919. In full bloom at 8,000 ft. A fine sight.

3rd August 1919. Still in flower in deep gloomy gullies where the Primulas grow.

12th August, 1919. Still in bloom. Flowers May to August.

N.E. Upper Burma. Kum-la Bum, Shing-rup Chat. Alt. 7,500–8,500 ft. Probably = 812, but much more abundant and in far finer character here. In opener places of the thinner Rain

Forest developing into a small tree literally covered with blossom. Flowers of a cherry-crimson so vivid that the effect is blood-scarlet from a little distance and in its fall the paths are crimson. Farrer No. **1518.** April 23, 1920.

A fine new species of the Burmese Rain Forest without pretension to hardiness. The Irroratum Series is not one that will enrich to any extent the open garden.

Rhododendron oulotrichum, Balf. f. et Forrest.

Fruticulus curviramosus vix 1 m. altus. Rami hornotini circ. 1 mm. diam. setulis longis contortis dense setulosi sparsim lepidoti, annotini rubro-grisei verruculosi esetulosi. Folia petiolata decidua post flores expansa ad 3.5 cm. longa; lamina papyracea obongo-elliptica vel obovata ad 3 cm. longa 1.7 cm. lata, apice rotundata tuberculato-mucronulata, margine plana pilis crispis plus minusve detersilibus ciliata, basi obtusa vel attenuata; supra olivacea opaca glabra (costa media erubescente sparsim puberula excepta); subtus pallidior setulis contortis vestita et squamis distantibus (ultra 1 mm.) conspersa, costa media dense setulosa sparsim lepidota, venis primariis utrinsecus ad 8 paullo prominulis; petiolus circ. 5 mm. longus ut rami juveniles vestitus. Umbellae 2–3-florae; pedicelli ad 1.5 cm. longi pilis cristatis intertextis dense vestiti, sparsim lepidoti. Calyx circ. 6 mm. longus 5-partitus pilis setulosis crispatis barbatus; lobi membranacei 4 mm. longi late triangulares acuti extus ubique setulis crispatis vestiti. Corolla flava maculata infundibuliformi-campanulata circ. 2 cm. longa, extus squamis parvis lepidota epilosa; tubus brevis circ. 6 mm. longus intus puberulus; lobi rotundati circ. 1.4 mm. diam. Stamina 10 corolla breviora inaequalia, longiora antica circ. 1.5 cm. longa filamentis basim versus puberulis, breviora postica circ. 1.2 cm. longa filamentis supra basim floccoso-villosis. Discus glaber. Gynaeceum corolla paullo brevius circ. 1.7 cm. longum; ovarium conoideum truncatum sulcatum lepidotum circ. 4 mm. longum; stylus clavatus deflexus glaber circ. 1.3 cm. longus stamina paullo superans; stigma latum lobulatum. Species Seriei Trichocladi.

Western Yunnan: Shweli-Salween divide. Western flank. Lat. 25° 20′ N. Alt. 10,000 ft. Open dry pasture on the margins of forests. Shrub of 2–4 ft. In fruit. Forrest No. **8905.** Aug. 1912.

Western Yunnan: N'Maikha-Salween divide. Lat. 26° 25′ N. Alt. 10,000 ft. Margins of cane brakes and on cliffs. Shrub of 2–2½ ft. Flowers yellow. Forrest No. **18,010.** June 1919.

N.E Upper Burma: Hpimaw Pass. Alt. 10,500 ft. Rocky gully on Burmese side of Hpimaw Pass. Probably = Farrer 876 in further development. Farrer No. **1023.** June 19, 1919.

In some features specially form of foliage this species resembles *Rh. lithophilum*, Balf. f. et Ward from Burma but the Burmese plant has an underleaf indumentum without hairs and of only a few far scattered scales and its pedicels and calyx want the copious covering of bristly curling hairs forming a wool in *Rh. oulotrichum*.

Farrer's plant is I believe this species but the material is very slight.

Rhododendron papillatum, Balf. f. et Cooper.

Frutex sub umbra Abietis crescens. Rami annotini 2.5 mm. diam. purpurei indumenti vestigiis notati glabrescentes. Alabastra anguste ovoidea pilis brevibus induta et glandulis viscida. Folia petiolata 11 cm. longa; lamina coriacea oblongo-ovalis vel anguste obovalis 9.5 cm. longa 3 cm. lata, apice acuta mucrone rostratim terminata, margine cartilaginea asperata plana vel paullo recurva, basi late obtusa; supra olivacea nunc purpurata laevis opaca olivacea glabra sed vestigiis obscuris indumenti juvenilis notata, costa media sulcata erubescente, venis primariis utrinsecus circ. 15 occultis; subtus flavida, costa media sparsim floccosa venisque primariis elevatis, reticulo ultimo prominulo, papillis epidermicis petasiformibus praedita, ubique pilis simplicibus et pilis compositis paucioribus grosse et breviter rubrostipitatis rosulatim ramosis indumentum tenue ut velum translucens aedificantibus obtecta; petiolus circ. 1.5 cm. longus ut rami vestitus. Umbella racemosa circ. 8-flora, rhachi vix 2 cm. longa; bracteolae styliformes 6 mm. longae pilosae; pedicelli circ. 1.5 cm. longi dense glandulosi (glandulis stipitatis) et sebaceo-pilosi. Calyx carnosulus 3 mm. longus ad medium 5-lobatus; lobi rotundati margine glandulosi. Corolla pallide flavido-alba roseo-maculata et varo maguo basali decorata subzygomorpha campanulata circ. 3.5 cm. longa extus intusque glabra, gibbosa, 5-loba; lobi rotundati emarginati 1 cm. longi 1.7 cm. lati. Stamina 10 inaequalia, longiora circ. 3 cm. longa, breviora circ. 2 cm.; filamenta deorsum dilatata dense puberula. Discus puberulus. Gynaeceum 4.5 cm. longum corolla longius; ovarium conoideum sulcatum truncatum circ. 8 mm. longum dense setuloso-glandulosum et pilis fasciatis obtectum; stylus longus exsertus glaber; stigma lobulatum subdiscoideum. Species Seriei Irrorati.

Bhutan. Bela Djang Pass. Alt. 10,000 ft. Bush Rhododendron under Abies. Flowers pale cream, pink spots and blotch inside. R. E. Cooper. No. **3885.** 10.5.15.

A species nearly allied to *Rh. Kendrickii* from which it differs and can be recognised at sight by the broader and shorter oblong-

oval leaves which have a thin underleaf indumentum arising amidst the dome-shaped papillae of the epidermis, by the glandular pedicels, the puberulous stamens and the densely glandular ovary with very long style.

Rhododendron phaedropum, Balf. f. et Farrer.

Arbor parva 4-5 m. alta. Rami ultimi tenues elongati recti, annotini circ. 2 mm. diam. vestigiis tomenti pilosi albidis notati. Alabastra tenuia elongata ad 3 cm. longa; perulae aciculares a basi brevi rotundatae sursum in caudam carinatam longam prolongatae. Folia petiolata ad 15 cm. longa; lamina crasse coriacea rigida lanceolata vel elongato-oblonga ad 13.5 cm. longa 2.5 cm. lata, apice acuta mucrone apiculato longo terminata, margine cartilaginea paullo recurva, basi attenuata anguste obtusa; supra pallide viridis laevis glabra, costa media anguste sulcata; venis primariis utrinsecus ad 18–20 vix visis; subtus laevis grisco-alba papillis epidermicis ceriferis ubique, (costa media elevata excepta pilis paucissimis forsan praedita?) argute vestita demum fulvescens, venis primariis occultis; petiolus ad 1.5 cm. longus purpurascens ut rami vestitus. Umbella circ. 8-flora; bracteolae lineares acutae a basi glutinoso-pilosae et sparsim setuloso-glandulosae circ. 1 cm. longae; pedicelli 1–1.5 cm. longi setuloso-glandulosi ad apicem incrassati. Calyx cupularis parvus ad 3.5 mm. longus; cupula atro-kermesina sparsim setuloso-glandulosa; lobi 5 inconspicui membranacei brunnei rotundati vel semilunati dorso glabri margine leviter setuloso-glandulosi. Corolla tubuloso-campanulata circ. 4.5 cm. longa coccinea basi gibbosa ibique nectarifera et varis 5 atro-kermesinis notata; lobi rotundati emarginati circ. 1.5 cm. diam. Stamina 10 inaequalia, longiora circ. 3.5 cm. longa, breviora circ. 2.5 cm.; filamenta glabra. Discus puberulus. Gynaeceum corollam subaequans; ovarium conoideum sursum attenuatum glandulis rubris breviter stipitatis et pilis albidis fasciatis intermixtis dense vestitum; stylus basi stipitato-glandulosus; stigma parvum. Species Seriei Neriiflori.

N.E. Upper Burma. Nyitadi. Alt 9,000 ft. A fairly large tidy tree 15 ft. in the middle alpine woodland. Foliage very glaucous on the reverse; flowers most beautiful, in shades of salmon-rose and light scarlet, scentless with glandular pedicels and deeper touches of colour in the folds of the lobes. Rare in the lower alpine woods of the Chawchi Pass but on the Maguchi very abundant right out over the open hillsides from 10–11,000 ft. Colours in all shades from straw-yellow to crimson with flaked and picotee forms. Most glorious Farrer No. **1530.** 16th Sept., 1920.

Rhododendron phaeochlorum, Balf. f. et Forrest.

Frutex virgatus ad 1 m. altus. Ramuli hornotini tenues circ. 1 mm. diam. pruni-glauci epilosi sparsissime lepidoti cum floribus coaetanei, annotini circ. 2 mm. diam. Alabastrorum perulae intimae membranaceae spathulatae laxe et brevissime ciliatae dorso lepidotae epilosae. Folia petiolata ad 7.5 cm. longa; lamina primo papyracea rubrinervis deinde chartacea oblongo-ovalis vel ovalis, circ. 6.5 cm. longa, apice nunc late obtusa nunc rotundata mucrone tuberculato prominulo vel depresso terminata, margine paullo recurva, basi obtusa interdum rotundata nec cordulata; supra olivacea primo nitens laevis demum opaca subreticulata elepidota epilosa (rarissime pilis paucissimis ad medium praedita), costa media rubra, venis primariis vix elevatis utrinsecus 8–10; subtus primo griseo-viridis postea pallide fulvido-olivacea lepidota diametro squamarum intervallis viridibus multo minore, squamis peziziformibus parvis (in quoque mm. quad. circ. 5) rubiginosis resino-infiltratis umbone concavo institaque angustissima, costa media elevata flavida glaberrima, venulis caeteris occlusis; petiolus circ. 1 cm. longus sulcatus ut ramuli vestitus. Flores inter folia immersi in umbellas plerumque 5–7-floras dispositi; bracteae et bracteolae mox deciduae; pedicelli subvirides stricti ad 2.5 cm. longi squamis sigilliformibus paucis conspersi sub calyce ampliati ibique densius lepidoti. Calyx cupuliformis ad 3 mm. longus 5-lobus; cupula extus lepidota pruni-glauca; lobi membranacei squami-cincti rotundati vel oblongi saepe inaequales elongati. Corolla alba kermesino-maculata basi varo notata ad 2.3 cm. longa infundibuliformi-campanulata extus glabra intus copiose puberula; limbus explanatus 5-lobus; lobi rotundati emarginati circ. 1.5 cm. diam. Stamina 10 inaequalia corolla paullo breviora; filamenta basi dense villosa. Discus dense puberulus. Gynaeceum circ. 3 cm. longum corollam excedens; ovarium conoideum truncatum circ. 4 mm. longum lepidotum; stylus glaber (nunc pilis paucis basi praeditus) sub stigmate lobulato expansus. Capsula 1.2 cm. longa recta brunnea lepidota valvis 5 ad basim dehiscens. Species Seriei Triflori, phyli *Rh. triflori,* Hook. f.

S.E. Tibet: Tsarong. Salween-Kiu-chiang divide. Forrest **19,200.** Aug. 1919.

Most distinct species. Noteworthy are:—The coaetaneous flowering immerses the flowers amongst the foliage. Glabrous glaucous prune-coloured twigs scantily puberulous epilose. The perulae and buds are very distinct, specially the paucity of hairs on the perulae. The leaves glabrous above (I saw one or two hairs on a young leaf). The red veins of young leaf. Leaves at first grey below. Underleaf scales distant about 5 to a sq. mm.

Petiole grooved no hairs. 5–7-flowered inflorescences. Long pedicels greenish with almost no scales save just below calyx. Calyx with conspicuous lobes. Corolla puberulous inside. Stamens villous. Style longer than corolla.

Rhododendron phoenicodum, Balf. f. et Farrer.

Frutex ad 2.5 m. altus. Rami tenues, annotini circ. 2.5 mm. diam. vestigiis tomenti adpressi e pilis albis compositi induti. Alabastra oblonga; perulae breves extimae breviter caudatae. Folia petiolata ad 10 cm. longa; lamina coriacea anguste obovalis vel oblongo-obovalis ad 8.5 cm. longa 3 cm. lata, apicem versus paullo angustata acutiuscula mucrone conspicuo terminata, margine cartilaginea paullo recurva, basi angustata; supra cinereo-viridis glabra costa media sulcata, venis primariis utrinsecus ad 15 pinnatim patentibus; subtus albida papillis epidermicis ceriferis dense vestita, costa media elevata pilis sebaceis plus minusve induta, venis primariis occultis; petiolus circ. 1.5 cm. longus ut rami vestitus. Flores 1–2 ad apicem ramorum umbellatim dispositi; bracteolae parvae circ. 4 mm. longae lineares pilosae; pedicelli circ. 5 mm. longi pilis albis sebaceis floccosi superne in cupulam calycinam expansi. Calyx circ. 8 mm. longus basi patelliformis (3 mm. longus) atro-kermesinus plus minusve sebaceo-pilosus margine in lobos 5 triquetriformes flavidos circ. 5 mm. longos acutos dorso glabros sed minute ciliatos extensus. Corolla coccinea tubuloso-campanulata vix 3 cm. longa; tubus septis imperfectis notatus et basi gibbosus sacculis atro-kermesinis; lobi rotundati circ. 1 cm. longi 1.5 cm. lati. Stamina 10 inaequalia, longiora circ. 2.3 cm. longa, breviora 1.5 cm.; filamenta glabra. Discus puberulus. Gynaeceum corollam fere aequans staminibus paullo longius; ovarium circ. 6 mm. longum sursum in stylum attenuatum pilis floccosis ubique dense vestitum; stylus basi floccosus; stigma parvum.

N.E. Upper Burma. Hpimaw Pass. Alt. 10,000 ft. Small (6–8 ft.) bush apparently diffused on the Chinese side of the Pass. On opener slopes of the more stunted bamboo-brakes. This specimen just unfolding bloom in a warm gully. Flowers scentless fiery scarlet and profusely borne making a fine contrast with the dark grey-green foliage and its white reverse. Farrer No. **877.** May 6, 1919.

Rhododendron poecilodermum, Balf. f. et Forrest.

Frutex circ. 1.5 m. altus. Rami robusti incrementis annuis brevissimis per annos foliis congestis et perulis marcidis ex toto obtecti demum grisei decorticantes. Alabastra anguste ovoidea acuta; perulae flavidae extimae rotundatae breves mucronatae

dorso pilis contortis albidis subtomentosae, interiores ovatae vel ovales subapiculatae, intimae ligulatae acutae circ. 2.3 cm. longae 2 mm. latae. Folia ad 13 cm. longa petiolata; lamina crasse coriacea rigida lanceolata vel oblanceolata ad 12 cm. longa 2.5 cm. lata, apice mucrone tuberculato erecto terminata, margine recurva, deorsum attenuata et ad basim angustam lobos duos rotundatos supra petiolum fingens; supra laete viridis nunc purpurascens opaca in modum squali corii rugulosa pilis rufis vestigialibus obscure conspersa glabrescens, costa media sulcata pilis dense impleta basim versus nunc brunneo-tincta, venis primariis utrinsecus ad 18 impressis; subtus rufo-variegata ("mottled") indumento molli crasso bistrato persistente ex toto induta, strati superi laxi pilis partim coloratis longe ramosis complanatis intertextis (cellularum muris tenuibus) fibrillas simulantibus, strati inferi pilis rosulatis in pelliculam aggregatis ramis brevibus vesiculosis incoloratis, costa media elevata deorsum haud multo dilatata; petiolus circ. 1 cm. longus laminae basi distincte angustior vix 3 mm. diam. tomento rufo involutus. Flores in racemo-umbellas compactas plurifloras foliis cinctas dispositi, rhachi circ. 7 mm. longa plus minusve pilosa; bracteae persistentes latae rotundatae mucronatae dorso plus minusve rufotomentosae et albido-sericeae ciliatae; bracteolae subulatae circ. 7 mm. longae pilosae; pedicelli circ. 1 cm. longi subalbido-villosi. Calyx parvus carnosulus glaber 5-lobus; lobi semi-lunati. Corolla infundibuliformis flavido-alba dense kermesino-maculata circ. 3.5 cm. longa extus glabra intus puberula basi subgibbosa; lobi 5 rotundati emarginati circ. 1.2 cm. longi 2 cm. lati. Stamina 10 inaequalia circum stylum aggregata, longiora circ. 2 cm. longa, breviora 1.4 cm. omnia corolla multo breviora; filamenta dense puberula. Discus glaber. Gynaeceum circ. 2.3 cm. longum stamina paullo superans corolla brevius; ovarium subcylindricum circ. 3 mm. longum truncatum sulcatum pilis albidis vel roseo-tinctis laxe vestitum; stylus validus basi sparsissime puberulus apice sub stigmate lobulato latiore haud incrassatus. Species Seriei Roxieani.

S.E. Tibet. Tsarong. Mekong-Salween divide. On Kagwr-pw. Lat. 28° 25′ N. 12,000 ft. Open situations in pine forests and amongst boulders. Shrub of 4–6 ft. Flowers creamy white flushed rose exterior. Forrest **14,432.** July 1917.

S.E. Tibet. Tsarong. Mekong-Salween divide. On Dokerla. Lat. 28° 25′ N. Alt. 12–13,000 ft. In rhododendron scrub. Shrub of 2–5 ft. Flowers white faintly flushed rose with crimson markings. Flowers and foliage fragrant. Forrest **16,723.** July 1918.

S.E. Tibet.—Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. Rocky situations amongst scrub at

the base of cliffs. Shrub of 2–3 ft. Flowers white with a few crimson markings. Forrest **19,185.** Aug. 1919.

The earlier specimens received of this plant led one to *Rh. Roxieanum*, G. Forrest and it is a very near ally but not the same species. It is the Mekong-Salween representative of that plant which is a Chungtien species, i.e., we have in *Rh. poecilodermum* the western representative of the eastern *Rh. Roxieanum*. The differences are perhaps small but I am satisfied the plants are distinct. The most evident character is the underleaf indumentum and its mottled character is a valid distinction from the concolorous scarlet indumentum of *Rh. Roxieanum*. But this colour is not the only difference. Both are bistrate but the hairs of the upper stratum in *Rh. poecilodermum* are softer looser flattened with thinner walls and want the resilience of those of *Rh. Roxieanum* where they are stiffer with thicker walls and are more dendriform in branching altogether shorter and their tips are sometimes tendrilloid. The leaf here is larger on the whole and has broader basal lobes and much shorter and not so broad petiole. The midrib below is narrower. The bud scales are different. In the flower the pedicels are shorter and less clad and the ovary has a loose whitish indumentum.

Forrest sends under 16723A a specimen of which he says "may be the same as 16723 but differs in stature, size of all parts, colour of tomentum and in flower markings." It was gathered same date same locality and environment as 16723. As the specimens appear in the dried state I am unable to discriminate between them.

Rhododendron porphyroblastum, Balf. f. et Forrest.

Frutex ad 1.5 m. altus. Rami crassi 5 mm. vel ultra diam. indumento plus minusve persistente dense rufo-tomentosi, seniores plus minusve perulati. Alabastra ovoidea acuta pruni-colorata; perulae extimae sublignosae anguste lanceolatae longe acuminatae recurvae interiores ovatae coriaceae acuminatae nitentes 1.5 cm. longae 1 cm. latae basi et circum apiculum tomentosae intimae membranaceae ligulatae acutae circ. 5 cm. longae 4 mm. latae persistentes. Folia petiolata ad 13 cm. longa; lamina crasse coriacea rigida oblongo-obovalis vel oblongo-ovalis ad 11 cm. longa 4 cm. lata, apice breviter rostrato-apiculata mucrone tuberculato sessili terminata, margine cartilaginea recurva, basi obtusa saepe inaequilateralis; supra juvenilis pilis detersilibus dense rufo-tomentosa, adulta glabra subnitida (costa media sulcata pilorum vestigiis impleta excepta) laete viridis nunc subpurpurascens basi circa costam mediam rufescens in modum squali corii subrugulosa venis primariis utrinsecus ad 12 subimpressis; subtus juvenilis roseo-tincta, adulta rubra indumento

crasso lanato persistente bistrato induta, strati superi pilis fibrillaribus coloratis complanatis elongatis iterum atque iterum acutangulatim ramosis ramis ultimis acutis, inferi pilis rosulatis ex ramis vesiculosis longis incoloratis constructis, costa media basi lata conspicua; petiolus ad 2 cm. longus ut rami vestitus. Gemmae florales magnae globosae; bracteae extimae crustaceae rotundatae ovatae carinatae apiculatae pilosulae sub anthesi persistentes, interiores ellipticae ad 3 cm. longae 1.5 cm. latae pilis longis albidis sericeae. Flores in umbellas breviter ramosas multifloras dispositi, rhachi circ. 1 cm. longa puberula; pedicelli circ. 1.5 cm. longi. Calyx parvus carnosulus glaber circ. 1 mm. longus lobis 5 rotundatis. Corolla alba roseo-suffusa? circ. 3 cm. longa intus puberula. Stamina 10 inaequalia corolla breviora. Ovarium sparsim floccosum; stylus glaber. Capsula recta circ. 1.7 cm. longa 5 mm. lata ab apice 5-valvata. Species phyli *Rh. sphaeroblasti.*

S.W. Szechwan. Mu-li Mts. Lat. 28° 12′ N. 13–14,000 ft. Margins of rhododendron forests and on open alpine pasture. Shrub of 4–5 ft. Flowers probably white flushed rose. Forrest **16,469.** June 1918.

S.W. Szechwan. Mts. around Mu-li. Lat. 28° 12′ N. Alt. 12,000 ft. Open situations on the margins of forests. Shrub of 4–5 ft. In bud. Forrest **16,314, 16,428.** June 1918. In fruit, **16,994.** Sept. 1918. In fruit. **17,109.** Nov. 1918. In fruit. **17,145.** Oct. 1918.

This Species nearest perhaps to *Rh. globigerum*, Balf. f. et Forrest in its phylum differs from that species in its purple non-glutinous buds.

Rhododendron probum, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Rami stricti tenues primo glandulis stipitatis induti, demum plus minusve eglandulosi. Folia chartacea ovalia nec obovalia ad 8 cm. longa (petiolo atro-kermesino ruguloso glanduloso ad 1.5 cm. longo incluso) 3.5 cm. lata, apice obtusa mucronulato-apiculata, basi rotundata vel truncata; supra atro-viridis opaca glaberrima; subtus purpureo-glauca pilis caulifloris vestita. Umbella circ. 8-flora; pedicelli circ. 1.5 cm. longi glandulis rubris sessilibus dense vestiti. Calyx parvus ad 3 mm. longus 5-lobus; cupula dense glandulosa; lobi cupulam aequantes membranacei glandulosi. Corolla alba emaculata evariculosa nunc roseo-marginata circ. 4 cm. longa. Stamina corolla gynaeceoque multo breviora; filamenta puberula. Ovarium glandulis stipitatis ascendentibus dense vestitum; stylus glaber. Species Seriei Selensis, *Rh. nanothammo*, Balf. f. et Forrest proxima.

Western N.W. Yunnan : Mekong-Salween divide. Lat. 28° 12′ N. Alt. 12,000 ft. Open thickets and pine forests. Shrub of 4–8 ft. Flowers white without markings, occasionally faintly margined rose. Forrest No. **14.227,** July 1917.

A species of the Selense Series from the Mekong-Salween divide having its nearest ally in *Rh. nanothammum*, Balf. f. et Forrest from the Salween–Kiu-chiang divide. Its promise to be a good plant in cultivation is as good as that given by *Rh. nanothammum* from which it differs in the glandular young stems, oval leaves with truncate base, glandular pedicels, larger flowers—1 cm. long—corolla tinted rose on margin and without a basal blotch.

386. **Rhododendron pubigerum,** Balf. f. et Forrest.

Frutex ad 1 m. altus. Ramuli annotini rubescentes ad 2 mm. diam. puberuli sparsim lepidoti. Perulae intimae alabastrorum membranaceae sublanceolatae longe ciliatae dorso lepidotae et puberulae. Folia petiolata ad 7 cm. longa; lamina chartacea ovalis ad 6 cm. longa 3 cm. lata, apice rotundata mucrone tuberculato conspicuo terminata, margine plana, basi rotundata vel subcordulata; supra olivacea opaca reticulata venis ultimis reticuli (sicco) prominulis sulcatis elepidota, costa media paullo sulcata erubescente puberula, venis primariis paullo elevatis utrinsecus circ. 8 pinnatim patulis; subtus cervina purpureo-tincta squamis discontiguis rubiginosis dense vestita, intervallis viridibus diametro squamarum subaequalibus squamis (in quoque mm. quad. circ. 8 10) pezizaeformibus uniformibus secretione intense ferruginea infiltratis, umbonis lati concavi institaeque angustae superficie plus minusve cerifera subglauca, costa media elevata erubescente glabra, venis primariis occultis; petiolus circ. 1 cm. longus sulcatus ut ramuli vestitus. Flores in umbellas terminales 4-floras dispositi; bracteae bracteolaeque mox deciduae; pedicelli ad 1.5 cm. longi glauco-purpurei plus minusve lepidoti sub flore obliquo dilatati. Calyx cupuliformis parvus vix 1.5 mm. longus extus lepidotus 5-lobus; lobi rotundati cupulam paullo excedentes. Corolla pallide roseo-lavandulacea copiose kermesino-maculata circ 2.5 cm. longa campanulata subzygomorpha intus puberula; limbus 5-lobus ampliatus late expansus; lobi ovales circ. 1.5 cm. longi 1 cm. lati. Stamina 10 inaequalia, longiora corollam subaequantia antheris ovoideis circ. 2.5 mm. longis, breviora circ. 1.3 cm. longa antheris globosis circ. 1 mm. diam.; filamenta carnosula deorsum vix dilatata basim versus puberula. Discus puberulus. Gynaeceum corollam subaequans vel ea paullo longius; ovarium conoideum sulcatum truncatum circ. 4 mm. longum; stylus glaber sub stigmate lobulato expansus. Species Seriei Triflori, phyli *Rh. oreotrephis*.

S.E. Tibet : Tsarong. Salween–Kiu-chiang divide. Forrest No. **19,206.** July 1919.

Nearest ally perhaps is *Rh. trichopodum*, Balf. f. et Forrest. Like that species it has puberulous branchlets, upper midrib, and petiole. Its leaves are larger than in *Rh. trichopodum* markedly reticulate when dry on upper opaque surface and usually cordulate at base. Its scales are more separate below and leave a glaucous purple waxy surface between them, which gives a like sheen to the whole under surface. The flower has copious crimson spots on the corolla. Perhaps only a form of *Rh. trichopodum*.

Rhododendron radicans, Balf. f. et Forrest.

Suffrutex nanus ad 2 dm. altus parvifolius implectus prostratus profuse radicans. Rami plurimi tenues (ultimi circ. 1 mm. diam.) perulati squamis peltatis albidis membranaceis inaequalibus lepidoti estrigillosi. Folia breviter petiolata ad 1.5 cm. longa sed saepe multo breviora ; lamina crasse coriacea anguste oblonga vel obovato-oblonga nunc fere sublinearis nunc obliqua ad 1.3 cm. longa 3.5 mm. lata, apice obtusa vel subacuta stipite mucronato conspicuo terminata, margine recurva pilis albidis tenuibus setuliformibus remotis plus minusve detersilibus ciliata, basi obtusa ; supra laete viridis nitens rugulosa (sicco) squamarum juvenilium albarum membranacearum vestigiis nunc notata, costa media glabra ; subtus primo griseo-albida deinde rufa dense imbricatim lepidota, costa media prominula straminea sparsim lepidota ; petiolus circ. 2 mm. longus ut rami vestitus. Flos solitarius terminalis ; bracteae crustaceae plus minusve sericeae et ciliatae sub anthesi persistentes pedicellorum basim cingentes, exteriores rotundatae apiculatae, interiores late obcuneatae truncatae circ. 6 mm. longae 4 mm. latae ; pedicelli erecti purpurei circ. 2 cm. longi sub calyce ampliati squamis albidis sessilibus et squamis stipitatis saepe decapitatis pilos simulantibus lepidoti. Calyx purpurascens apertus circ. 5 mm. longus fere ad basim 5-partitus ; lobi aequales ovati acuti circ. 2 mm. lati intus sericei extus dense lepidoti et plus minusve puberuli setuloso-ciliati. Corolla atro-purpurea postice coccineo-maculata subrotata circ. 1.5 cm. longa ; tubus brevissimus fauce intus puberula ; limbus extus velutino-puberulus et lepidotus ; lobi lati rotundati circ. 1 cm. lati. Stamina 10 corolla et gynaeceo multo breviora ; filamenta purpurea ad basim glabra supra breviter floccosim villosula. Discus puberulus. Gynaeceum corollam subaequans ; ovarium petasiforme circ. 3 mm. longum imbricatim albido-lepidotum ; stylus glaber coccineus ; stigma discoideum. Species Seriei Saluenensis *Rh. keletico*, Balf. f. et Forrest affinis.

S.E. Tibet. Tsarong. Salween Kiu-chiang divide. Forrest No. **19,919.**

One of the non-bristly forms of the Series Saluenense finding its nearest ally in *Rh. keleticum*, Balf. f. et Forrest from the same district. It differs from that species in its more prostrate matted habit the branches rooting freely where in contact with the soil, in its much smaller narrower leaves often, Forrest says, almost linear, in its much smaller less brightly coloured calyx which is densely sericeous inside.

Rhododendron scyphocalyx, Balf. f. et Forrest.

Frutex ad 1.5 m. altus. Rami juveniles pilis adpressis intertextis in formam indumenti vestiti mox plus minusve nudi, annotini circ. 2 mm. diam. vestigiis indumenti notati, eglandulosi. Perulae fugitivae. Folia petiolata ad 10 cm. longa; lamina coriacea obovata ad 9.5 cm. longa 4 cm. lata, apice rotundata nunc paullo retusa mucrone apiculato terminata, margine cartilaginea plana, basi auriculata; supra intense viridis glabra, costa media sulcata, venis primariis utrinsecus circ. 12–14 paullo impressis; subtus albida indumento tenui scintillante laevi unistrato vestita pilis indumenti rosulatis brevi-ramosis, costa media erubescente primo pilis rosulatis pruinosa glabrescente; petiolus circ. 5 mm. longus plus minusve indumento albido vestitus. Umbella circ. 4-flora; bracteae extimae carinatae longe caudatae indumento albido plus minusve obtectae; pedicelli circ. 3 cm. longi dense setuloso-glandulosi et pilis fasciatis floccosi ad apicem ampliati. Calyx cupuliformis persistens semper erectus ad 1 cm. longus; cupula atro-kermesina ut pedicellus setuloso-glandulosa in limbum membranaceum flavido-viridem expansa; limbus circ. 5 mm. vel ultra longus extus glaber viridis ad medium 5-lobus; lobi rotundati 7 mm. vel ultra lati margine minute ciliati. Corolla lutco-coccinea circ. 4 cm. longa tubuloso-campanulata intus septis incompletis notata, basi plus minusve gibbosa et atro-kermesina; lobi 1.5 cm. longi 2 cm. lati. Stamina 10 circum stylum aggregata subaequalia circ. 3 cm. longa; filamenta basi villosa. Discus puberulus. Gynaeceum circ. 3.5 cm. longum; ovarium circ. 5 mm. longum petasiforme sulcatum truncatum pilis fasciatis cum glandulis setulosis intermixtis tomentosum; stylus nudus; stigma subdiscoideum. Species Seriei Sanguinei.

N.E. Upper Burma. N'Maikha-Salween divide. Western flank. Lat. 26° 35′ N. Alt. 12–13,000 ft. In bamboo and mixed scrub. Shrub of 4–5 ft. Flowers very dark yellowish crimson. Forrest No. **18,050.** May 1919.

Western Yunnan. Shweli-Salween divide. Lat. 25° 45′ N. Alt. 10–11,000 ft. Open rocky slopes and on the margins of cane brakes. Low much-branched shrub of 2–3 ft. Flowers including calyx more or less rose-orange shaded to deep rose at apex. Forrest No. **18,178.** June 1919.

Western Yunnan. Shweli-Salween divide. Jangtzow Shan. Alt. 11,000 ft. Lat. 25° 10′ N. On cliffs. Dupl. in fruit. Forrest No. **18,308.** Aug. 1919.

The N'Maikha-Salween form of this species is much finer than the Shweli-Salween one if one may judge by the dried specimens. The beautiful white underleaf in the N'Maikha plant contrasts well with the bright flower colour. Note how much larger this is than the Shweli-Salween plant No. 18,178 in the striking feature of leaf. In calyx the latter is first. The phylum resemblance is very evident and the species is near *Rh. sanguineum* itself—indeed its bright foliage and flower bring it at sight close to *Rh. sanguineum* but its glandular features keep it separate.

Other plants collected by Forrest are perhaps this species :—

No. **18,082.** Shweli-Salween divide. Jangtzow Shan. Alt. 12,000 ft. Lat. 25° 10′ N. On rocky slopes and cliffs. Shrub of 2½–4 ft. Flowers dark crimson tinged orange. June 1919.

No. **18,322.** Shweli-Salween divide. 12,000 ft. Lat. 25° 40′ N. Open bouldery slopes. Shrub of 3–4 ft. Flowers rose flushed orange? In fruit. Aug. 1919.

And then from Farrer we have probably the same in his No. **1024.** N.E. Upper Burma, Hpimaw Pass. Alt. 10,500 ft. June 19, 1919. A small bush in rocky gully on the west side of Hpimaw Pass. Flowers waxy scentless with deep nectaries; of a variable colour in shades of apricot, bronze and coppery-yellow. Very abundant over all the high-alpine slopes.

Rhododendron semilunatum, Balf. f. et Forrest.

Frutex virgatus vix 1 m. altus. Rami stricti erecti, hornotini tenuiter lanati et sparsim lepidoti, annotini albidi sparsim verruculosi nunc pilorum vestigiis notati. Folia papyracea decidua post flores evoluta breviter petiolata ad 2.8 cm. longa (vix matura); lamina papyracea ovalis vel oblongo-ovalis circ. 2.5 cm. longa 1.3 cm. lata, apice rotundata vel obtusa tuberculato-mucronata, margine plana sparsim tenuiter setuloso-ciliata demum nuda, basi obtusa vel attenuata; supra laete viridis opaca glabra (costa media rubra puberula excepta); subtus pallidior griseo-viridis squamis discontiguis (in quoque mm. quadr. circ. 8–10) inaequalibus majoribus flavidis scintillantibus minoribus nigricantibus lepidota, costa media elevata lepidota et squamis crispatis basim versus vestita, venis primariis utrinsecus circ. 8 paullo prominulis; petiolus circ. 3 mm. longus ut rami juveniles vestitus. Umbellae 2–3-florae; pedicelli glauco-caerulei lepidoti nunc etiam sparsim setulosi circ. 1.5 cm. longi sub calyce ampliati. Calyx parvulus obliquus vix 2 mm. longus in lobos 5 semilunatos ad marginem undulatus; lobi subcarnosuli extus sparsim lepidoti squamo-ciliati nunc paucis setulis ciliati. Corolla lutea

et maculata aperte campanulata circ. 2 cm. longa extus epilosa sparsim lepidota; lobi 5 rotundati circ. 1.2 cm. diam. Stamina 10 corolla breviora inaequalia, longiora antica circ 1.7 cm. longa filamentis basim versus minute puberulis, breviora postica circ. 1.2 cm. longa filamentis supra basim floccoso-villosis. Discus magnus 1 mm. longus glaber. Gynaeceum 1.9 cm. longum corollam subaequans; ovarium cylindricum sulcatum truncatum circ. 4 mm. longum squamis carnosulis parvis dense vestitum; stylus validus sursum ampliatus apiceque incrassatus circ. 1.5 cm. longus rectus vel plus minusve a basi decurvatus glaber; stigma latum lobulatum. Species Seriei Trichocladi.

Western N.W. Yunnan. Mekong-Yangtze divide. On the ascent of the Wei Hsi Pass. Lat. 27° 15′ N. Alt. 10,000 ft. Moist open situations in pine forests. Forrest No. **698.** September 1904.

S.E. Tibet: Tsarong. Salween-Kiu-chiang divide. Lat. 28° 40′ N. Long. 98° 15′ E. Open situations on the margins of thickets and amongst rocks. Shrub of 2–3 ft Flowers very deep yellow. Forrest No. **18,909.** June 1919.

Western N.W. Yunnan. Ascent of the Siela Pass. Lat. 28° N. Alt. 11–12,000 ft. Open scrub on the margin of forest. Shrub of 3–4 ft. Flowers yellow. Forrest No. **16,368.** April 1918.

Quite a distinct species of the Trichocladum Series. It recalls *Rh. mekongense*, Franch. in many features but that species has a calyx with very large membranous setulose lobes. *Rh. melinanthum*, Balf. f. et Ward is also a species near it in the series but *Rh. melinanthum* has a different kind of lepidote indumentum on the underleaf surface and has a much longer more delicate style.

Rhododendron shweliense, Balf. f. et Forrest.

Frutex aromaticus vix 1 m. altus. Rami haud perulati juveniles erubescentes, annotini circ. 1 mm. diam. lepidoti estrigillosi. Folia petiolata ad 5.5 cm. longa plus minusve ad apicem ramorum rosulatim aggregata; lamina crasse coriacea obovato-oblonga vel suboblonga circ. 4.5 cm. longa 1.5 cm. lata, apice rotundata mucronata, margine subcartilaginea obscure undulata, basi obtusa vel cuneata saepe inaequalis; supra pallide viridis opaca primo squamis imbricatis dense lepidota, squamis demum plus minusve detersilibus, costa media sulcata sparsim puberula; subtus albo-grisea papillis epidermicis ceriferis tecta et squamis nigricantibus discontiguis (in quoque mm. quadr. circ. 3) vestita, costa media elevata lepidota, venis primariis utrinsecus ad 10 prominulis et lepidotis; petiolus ad 1 cm. longus ut rami vestitus saepe squamis subverruculosus. Flores in umbellas 4(?)-floras terminales; pedicelli vix 2 cm. longi lepidoti. Calyx ad 7 mm.

longus (sub fructu auctus) viridis cerifer glaucus 5-partitus; lobi late ovales obtusi circ. 5 mm. longi flabelliformiter venulosi extus lepidoti. Corolla campaniformis subcarnosula circ. 1.5 cm. longa viridi-lutea (?) basi gibbosa extus glabra intus basi puberula; lobi integri rotundati 5 mm. longi. Stamina vix carnosula ad medium puberula. Discus glaber. Ovarium petasiforme circ. 2 mm. longum sulcatum truncatum lepidotum; stylus leviter curvatus sub stigmate lobulato paullo incrassatus, basi lepidotus. Species phyli *Rh.brachyanthi.*

Western Yunnan. Shweli-Salween divide. Lat. 25° 40′ N. Alt. 10–11,000 ft. Shrub of 2–2½ ft. Foliage aromatic. Flowers ? green-yellow. On open cliffs and rocky slopes. Forrest No. **18,151.** June 1919.

Here we have a S.W. Chinese representative of the type found further East and North in the Tali *Rh. brachyanthum*, Franch. and in *Rh. hypolepidotum*, Balf. f. et Forrest of the Mekong-Salween divide. It recalls also in many ways *Rh. charitopes*, Balf. f. et Forrest from N.E. Upper Burma. With these it forms a special phylum in the Series of Campylogynum. Its distincitve features are to be found in the leaves densely lepidote above and discontiguously black-punctulate on the grey-white surface below, the green sepals with prominent fan-shaped venation, the green-yellow corolla and the thin lepidote style.

Rhododendron sigillatum Balf. f. et Forrest.

Frutex eglandulosus. Rami juveniles crassi, annotini ad 4 mm. diam. indumento persistente pallide fulvo e pilis rosulatis vesiculosis demum plus minusve agglutinatis constructo ex toto involuti. Alabastra oblongo-ovoidea acuta: perulae puberulae exteriores plus minusve caudatae. Folia petiolata ad 10 cm. longa; lamina coriacea oblongo-elliptica vel oblonga nunc subelongato-obovata ad 9 cm. longa 4 cm. lata, apice late obtusa vix rotundata mucrone tuberculato terminata sed nunc subrostratim apiculata, margine cartilaginea paullo recurva, basi late obtusa vel subrotundata vel truncata nec cordulata; supra nitida subbrunneo-viridis vestigiis pilorum juvenilium minute puberula, costa media sulcata puberula, venis primariis utrinsecus ad 15 paullo impressis inconspicuis; subtus pallide fulva laevis mollis indumento tomentoso scintillante e pilis rosulatis breviter stipitatis pluri-ramosis vesiculosis aedificato vestita, costa media et venis occultis; petiolus crassus circ. 1 cm. longus 2 mm. diam. ut rami tomentosus. Flores ad 10 in umbellam breviter racemosam terminalem dispositi, rhachi circ. 8 mm. longa tomentosa; bracteae dense tomentosae; bracteolae lineares circ. 1 cm. longae ex toto pilosae; pedicelli virides stricti adscendentes ad 1.5 cm. longi laxe pubescentes plus minusve glabrescentes. Calyx

minutus; cupula circ. 1 mm. longa carnosula glabra inaequaliter 5-dentata; lobi rubri submembranacei pubescentes ciliati, lobo postico maximo anguste lanceolato-acuminato circ. 4 mm. longo. Corolla infundibuliformis circ. 3.5 cm. longa alba roseo-suffusa kermesino-maculata evariculosa paullo 5-gibbosa intus basi obscure puberula; lobi 5 rotundati 1 cm. longi 1.3 cm. lati emarginati crenulati. Stamina 10 inaequalia corolla multo breviora, longiora circ. 2.3 cm. longa antheris 3 mm. longis, breviora 1.5 cm. longa antheris 2.5 mm. longis; filamenta citronea deorsum dilatata a basi ad ovarii apicem puberula; antherae pallide ochraceae. Discus puberulus. Gynaeceum circ. 2.4 cm. longum vix staminibus longius; ovarium angustum circ. 5 mm. longum 1.5 mm. diam. cylindrico-conoideum truncatum glabrum; stylus glaber in stigma lobulatum paullo expansus. Species *Rh. dryophyllo*,, Balf. f. et Forrest affinis.

Western N.W. Yunnan. Mekong-Salween divide. Alt. 10,000 ft. Lat. 27° 40′ N. Open pine forests. Shrub of 6–12 ft. Flowers white with crimson markings. Forrest No. **14,145.** July 1917.

Western N.W. Yunnan. On the Bei-ma-shan. Alt. 12-13,000 ft. Lat. 28° 12′ N. Forming forests. Shrub of 20–25 ft. Flowers white washed rose exterior with crimson markings. Forrest No. **14,024.** June 1917.

Western N.W. Yunnan. Mekong-Salween divide. Alt. 12,000 ft. Lat 28° 12′ N. In rhododendron thickets. Shrub of 4–8 ft. Flowers flushed rose exterior with crimson markings. Forrest No.**14,267.** July 1917.

Near *Rh. dryophyllum*, Balf. f. et Forrest but has elliptic leaves.

Rhododendron sino-vaccinioides, Balf. f. et Forrest.

Fruticulus ad 6 dm. altus nunc epiphyticus laxe vage ramosus speciei Vaccinii simillimus. Rami graciles hornotini circ. 1 mm. diam. squamis pallidis flavido-albidis crasse stipitatis dense vestiti, annotini et vetustiores squamarum decapitatarum stipitibus spadiceis vel fuscis verruculosi. Folia vix petiolata ad 1.5 cm. longa 7 mm. lata coriacea obovata, apice rotundata paullo emarginata mucrone tuberculato in sinu immerso terminata, margine albo-cartilaginea plana (in juventute minutissime sparsim ciliata), deorsum gradatim ad insertionem angustata; supra atroviridis nitens obscure discontigue lepidota squamis parvis brunneis inter se circ. 0.5 mm. distantibus, costa media sulcata glabra, venis primariis occultis; subtus pallide viridis squamis brunneis distantibus (in quoque mm. quadr. circ. 3–4) punctulata, costa media prominula lepidota. Flores solitarii terminales; pedicelli circ. 1 cm. longi sparsim praecipue apicem versus lepi-

doti sub calyce expansi. Calyx parvus ad 2 mm. longus profunde 5-partitus; cupula lepidota; lobi membranacei glabri ovati vel oblongo-ovati obtusi circ. 1.5 mm. longi. Corolla late tubulosa circ. 7 mm. longa alba extus intusque glabra 5-loba; lobi ad 2 mm. longi oblongo-ovales obtusi integri erecti. Stamina 8 subaequalia circ. 7 mm. longa corollam aequantia; filamenta in dimidio infero glabra vel subglabra, supra medium fere ad antheras puberula. Discus glaber. Gynaeceum brevissimum corolla staminibusque brevius circ. 5 mm. longum; ovarium ovoideum sulcatum truncatum dense albido-lepidotum ad 2 mm. longum; stylus ovario paullo longior ad 3 mm. longus crassus clavatus decurvatus glaber; stigma lobulatum. Capsula valvis 5 dehiscens; lamellae placentiferae 5 ad apicem cohaerentes a basi ab axi detersiles et in formam filorum delicatorum ab apice fructus residentes. Species ex affinitate *Rh. vaccinioides*, Hook. f.

S.E. Tibet : Tsarong. Salween-Kiu-chiang divide. Lat. 28° N. Long. 98° 30′ E. Alt. 12,000 ft. On ledges and in crevices of cliffs. Shrub of 2–2½ ft. Flowers white. Forrest No. **20,073.** July 1921.

This interesting plant of recent acquisition by Forrest is the representative in the further East of Hooker's Sikkim *Rh. vaccinioides*. It adds another to the series of such representative forms as we see in *Rh. Falconeri* and *Rh. sino-falconeri* of the Falconeri Series; *Rh. grande* and *Rh. sino-grande* of the Grande Series; *Rh. Nuttallii* and *Rh.sino-nuttallii* of the Maddeni Series —these of the large-leaved species; *Rh. lepidotum* and *Rh. sino-lepidotum* of the Anthopogon Series; *Rh. virgatum* and *Rh. sino-virgatum* amongst the smaller-leaved species. Doubtless we shall come to know others. The difference between western and eastern form is sometimes not great and perhaps increased knowledge of the area intervening between the Himalaya and the high ranges of Western China will bring to us links in the relationship. I have not had the advantage of being able to dissect a flower of *Rh. vaccinioides* and the material of Forrest's plant as yet available is scanty so that further critical examination will be necessary. I am not however able to correlate precisely the features I find in Forrest's plant with those of the published description in the Flora of British India. The Chinese plant is a smaller one, differs in the indumentum, and one flower of it—there were only three—which I examined had 8 stamens; there are 10 in *Rh. vaccinioides*. The type of fruit and seed is noteworthy. I give a further description from additional material that has come from Forrest :—

Capsule slightly curved pointed about 2 cm. long 3.5 mm. in diameter on a short gynophore, 5-valvate from apex, carpellary septa thin crustaceous adhering to axis at apex only and hanging

as 5 thin seminiferous plates within the carpellary valves which, recurving as they dry, gradually expose the plates with the seeds. Seeds with at each end a thread aril the whole as much as 1 cm. long; the body of the seed fusiform pale brown barely 1 mm. long, the funicular and chalazal arils white and of about equal length.

Forrest in this plant gives us another of a series of which hitherto we have known from China only two species :—*Rh. emarginatum*, Hemsl. et Wils., a plant collected by Henry at Mengtsz, and *Rh. euonymifolium*, Lévl., a plant gathered in Kweichow by the French Missionaries. These three form a small series or perhaps phylum of Chinese species the relationship of which awaits working out. It may not be amiss here to point out that there are in the Philippine Islands some species—*Rh. quadrasianum*, *Rh. malingdanense*, *Rh. rosmarinifolium*—which in habit of foliage appear to have some relationship with the Chinese ones I am writing about. As to what is the degree of kinship I have no material from which to attempt to arrive at a conclusion and little attention has been given to links between the Eastern Asiatic Mainland species and those of the islands to the South. In the case I present we have an interesting field of investigation which has not been gathered from.

Rhododendron sperabile, Balf. f. et Farrer.

Fruticulus lignosus ramos plurimos erectos emittens. Rami juveniles circ. 3 mm. diam. indumento denso albo persistente e pilis lanatis crispatis siccis cum setulis rubro-glandulosis intermixtis aedificato vestiti, indumento in ramis vetustioribus nigricante. Perulae alabastrorum aciculares ut rami indutae. Folia petiolata ad 8.5 cm. longa; lamina crasse coriacea oblongo-ovalis ad 8 cm. longa 2 cm. lata acuminata mucrone rubro tuberculato apiculatim terminata, margine cartilaginea plana vel paullo recurva, basi subattenuata et nunc subauriculata; supra in juventute indumento albo e pilis intertextis dendriformibus ramos tendrilliformes gerentibus et e setulis rubris glandulis intermixtis aedificato obtecta, in maturitate pilorum vestigiis in costa media sulcata notata et pedibus setularum ubique plus minusve punctulata pallide viridis, venis primariis utrinsecus ad 12 impressis pinnatim patentibus picturata; subtus primo alba demum pallide fulva indumento persistente lanato crasso alveolato e pilis elongato-dendriformibus multi-ramosis ramis crispatis ubique obtecta; petiolus circ. .5–1 cm. longus ut rami vestitus. Flores 4–5 in umbellam terminalem dispositi; bracteae internae sub anthesi plus minusve persistentes membranaceae obovato-spathulatae subtruncatae apiculatae dense sericeae et sparsim setuloso-glandulosae; bracteolae breves circ. 5 mm. longae pilosae; pedi-

celli breves 2 cm. longi dense setuloso-glandulosi et albo-lanati sub calyce expansi. Calyx parvus circ. 1.5 mm. longus; cupula carnosula 5-lobulato-undulata et glanduloso-ciliata saepe rubra. Corolla coccinea tubuloso-campanulata circ. 3.5 cm. longa carnosula intus basi septis incompletis decorata et sacculis 5 atro-kermesinis gibbosa; lobi 5 rotundati emarginati circ. 1.5 cm. diam. Stamina 10 inaequalia, longiora fere corollam aequantia; filamenta glaberrima. Discus sparsim puberulus. Gynaeceum corollam aequans; ovarium tenue sursum in stylum attenuatum sulcatum setulis glandulosis et pilis albidis contortis ramosissimis obtectum; stylus saepe ad medium setuloso-glandulosus et pilosus; stigma parvum diametro styli minus. Species Seriei Haematodei.

N.E. Upper Burma. Hpimaw Pass. Alt. 10,000 ft. Small bush with erect new shoots—their shaggy investiture of white wool contrasting finely with the pure clear scarlet of the rather waxy flowers hanging below and almost all falling when found with Farrer No. 887 in ravine below the Pass. An odd parallel with Farrer No. 877 [*Rh. phoenicodum*] on the Chinese side. Also on Burmese side coming to its full and with a tawnier indumentum. R. Farrer No. **888.** Maylo. May 7, 1919.

Kingdon Ward collected in 1914 a plant in Eastern Upper Burma to which he attached the field ticket :—

Forests below Feng-shin-hing Camp. Alt. 10,000 ft. Dwarf procumbent undershrub on a granitic scree facing South. Flowers scarlet. No. **1689.** 20.6.14.

Ward's material was very slight and I hesitated about naming it. I could only assign it to the vicinity of *Rh. euchroum*. I am disposed to think that Ward's plant of 1914 is this *Rh. sperabile* of which Mr Farrer got a splendid series of specimens enabling identification to be made without difficulty. There are some divergences in character however and if I place Ward's No. 1689 in the species it is with the caveat that further investigation is needed to confirm it.

Rh. sperabile is a near ally of *Rh. euchroum* but from Farrer's specimens I judge *Rh. sperabile* is the finer plant. Separating characters are these :—*Rh. euchroum* has essentially a leaf wider above the middle—oblanceolate; here this is not so. Then the stamens here are glabrous, in *Rh. euchroum* densely puberulous.

From seed collected by Farrer there have been raised seedlings of *Rh. sperabile* at the Royal Botanic Garden, Edinburgh, and out of doubt elsewhere. It is one of the finest species he has found.

Rhododendron spilotum, Balf. f. et Farrer.

Arbor parva. Rami juveniles ad 1.5 mm. diam. purpurei

dense setuloso-glandulosi setulis persistentibus. Folia petiolata ad 12 cm. longa; lamina coriacea ovali-lanceolata ad 11 cm. longa 4 cm. lata rostratim acuta, margine cartilaginea paullo recurva basi auriculata; supra brunnea vel atro-viridis et albo-pruinosa nitens laevis glabra, costa media sulcata vestigialiter sparsissime glandulosa, venis primariis utrinsecus 12–14 paullo impressis; subtus laevissima flava glandulis rubro-punctata, costa media erubescente sparsim glandulosa elevata, venis primariis pinnatim prominulis; petiolus purpureus setuloso-glandulosus 1 cm. longus. Umbellae ad 8-florae terminales breviter racemosae rhachi circ. 1 cm. longa glandulosa; bracteae exteriores crustaceae cucullatae marginatae oblongae 1 cm. latae apice rotundatae dorso glutinosae glandulis sessilibus obtectae, interiores membranaceae obovatae spathulatae rostratim apiculatae dense sericeae ad 3 cm. longae 1 cm. latae; bracteolae lineares circ. 1 cm. longae acutae dorso ex toto pilosae pilo-cristatae; pedicelli ad 3 cm. longi stricti ascendentes setuloso-glandulosi ad apicem ampliati. Calyx conspicuus ad 7 mm. longus.; cupula atro-kermesina setuloso-glandulosa 5-loba 2 mm. longa.; lobi persistentes rosei circ. 5 mm. longi elongato-triangulares obtusi dorso glandulis brevibus sparsim praediti margine glandulis longe stipitatis ciliati. Corolla infundibulari-campanulata circ. 4 cm. longa pallide rosea varo basali postico notata extus intusque glabra basi subgibbosa; lobi rotundati circ. 2 cm. diam. Stamina 10 inaequalia corolla gynaeceoque breviora, longiora circ. 3 cm. longa, breviora circ. 2 cm.; filamenta deorsum dilatata et a basi sursum fere ad medium dense glutinoso-puberula glandulisque induta. Discus puberulus. Gynaeceum corollam aequans; ovarium circ. 3 mm. longum conoideum sulcatum truncatum dense setuloso-glandulosum; stylus longus basi setuloso-glandulosus; stigma effusim lobulatum stylo paullo latius.

N.E. Upper Burma: Nyitadi. Flowers not many bell-shaped pink with basal blotch of crimson. Alpine woodland. A small tree always rare occurring very rarely and in rare specimens. The upper surface of the leaves has a glistening white rime. Farrer No. **1539.** May 9, 1920.

A distinct species falling into the Neriiflorum Series. The underleaf with punctulations of red glands suggests also Irroratum Series to which however it has not affinity. The strigillose-glandular character throughout is very marked and the red membranous calyx—not deciduous—with its glands surrounding the developing fruit is a prominent feature.

Rhododendron spodopeplum, Balf. f. et Farrer.

Frutex circ. 6 dm. altus. Rami stricti virgati, annotini circ.

1.5 mm. diam. lepidoti, vetustiores verruculosi. Folia petiolata ad 6 cm. longa; lamina coriacea rigida anguste lanceolata vel oblongo-lanceolata circ. 5.3 cm. longa 1.5 cm. lata utrinque attenuata, apice late acuminata vel acuta mucrone kermesino terminata, margine cartilaginea paullo recurva obscure undulata, basi cuneata; supra primo squamis aurantiacis subscintillantibus discontiguis vestita dein squamarum vestigiis nigricantibus obscure notata, costa media rufa glabra, venis primariis suboccultis; subtus fere nigrocinerea papillis epidermicis ceriferis cinereis tecta squamis biformibus discontiguis (in quoque mm. quadr. circ. 12) nigricantibus (majoribus paucis punctiformibus) vestita, costa media erubescente sparsim nigro-lepidota, venis primariis occultis; petiolus circ. 7 mm. longus lepidoto-verruculosus. Umbellae triflorae terminales; bracteae deciduae; bracteolae circ. 8 mm. longae clavato-lineares a basi pilosae pilo-cristatae; pedicelli purpurei 1 1.5 cm. longi dense lepidoti superne incrassati. Calyx foliaceus 5-partitus ad 6 mm. longus (post anthesin auctus ad 1 cm. vel ultra); cupula purpurea dense lepidota; lobi oblongo-ovati flabellatim striati primo flavido-virides margine minutissime denticulati saepe squamo-ciliati etiam pilo-ciliati demum subrigidi cero-glauci erubescentes margine cum denticulis auctis setulosi. Corolla anguste infundibuliformis pallide rosea circ. 3 cm. longa 5-loba; tubus angustus basi circ. 2 mm. diam. sursum in limbum latum 1.7 mm. longum ampliatus intus extusque glaber; limbus extus lepidotus; lobi oblongo-ovales circ. 1.3 cm. longi 8 mm. lati integri. Stamina (in floribus paucis visis verisimiliter abnormia) brevissima inaequalia, longiora circ. 8 mm. longa, breviora circ. 5 mm.; filamenta ad basim puberula; antherae parvulae. Discus puberulus. Gynaeceum circ. 2 cm. longum corolla multo brevius; ovarium conoideum profunde sulcatum circ. 3 mm. longum in stylum attenuatum; stylus basi lepidotus sub stigmate discoideo lobulato vix ampliatus. Species *Rh. tephropeplo*, Balf. f. et Farrer affinis.

N.E. Burma. Crags of Shing Hong. Alt. 10,000 ft. Farrer **1645**. June 21, 1920. With the last two a bush of 2 feet or so. Flowers rosy-pink. I cannot be certain that this does not = Farrer 1567 [*Rh. tephropeplum*].

Rh. spodopeplum is certainly a near ally of *Rh. tephropeplum*, Balf. f. et Farrer as Mr Farrer suggests but they are not the same species. They agree in the ash-grey indumentum produced in the same way on the underleaf-surface—quite an exceptional character in the genus. In *Rh. spodopeplum* the transition from an earlier brown-grey state is clearly seen. But the leaves in *Rh. spodopeplum* are much narrower than in *Rh. tephropeplum* and are acuminate or very acute. Flower-characters give an

equally definite and easily seen difference between the species. Here we have a larger flower :—the larger calyx having a toothed and ultimately setulose margin and the flabelliform striation shows up conspicuously under the glaucous waxy surface; the corolla which is lepidote outside not glabrous has a long narrow funnel-tube and the lobes are oblong-oval and quite entire not rounded and deeply emarginate. As to the stamens I am unable to say much. In the few not very good flowers which I have had for investigation the stamens impress me as deformed structures. Perhaps the best alliance in which to place this as we know it now is (along with *Rh. tephropeplum*) that of *Rh. aureum*, Franch.

Rhododendron sub-erosum, Balf. f. et Forrest.

Frutex virgatus fere 3 m. altus. Ramuli hornotini virides squamis latis albidis induti, annotini circ. 1.5 mm. diam. cinerei nigro-lepidoti epilosi. Perulae extimae crustaceae rotundatae ciliatae dorso nudae, intermediae ovatae vel ovato-ellipticae dorso lepidotae, intimae membranaceae spathulatae ad 1.5 cm. longae 3 mm. latae dorso medio lepidotae et rugulosae margine ciliatae et setulosae. Folia petiolata ad 7 cm. longa; lamina coriacea anguste lanceolata utrinque attenuata ad 6.5 cm. longa 2 cm. lata, acuminata mucrone rubro prominulo terminata, margine sub-erosa paullo recurva pilis et setulis deinde aculeato-asperata, basi cuneata; supra pallide viridis leviter in modum squali corii rugulosa squamis vestigialibus distantibus obscuris notata, costa media erubescente puberula, venis primariis occultis; subtus pallidior laevis squamis parvis rufescentibus 1 mm. vel ultra inter se distantibus vestita, costa media prominula sparsissime lepidota, venis primariis occultis; petiolus circ. 5 mm. longus rubidus lepidotus et setulosus. Flores in umbellas axillares 2–3-floras ad apicem ramorum dispositi, umbellis nunc fasciculatim aggregatis nunc plus minusve internodiis elongatis separatis; bracteae bracteolaeque mox deciduae; pedicelli tenues ad 1 cm. longi dense lepidoti sub flore expansi. Calyx cupuliformis parvus vix 1 mm. longus 5-dentatus extus dense lepidotus margine grosse et dense setulosus. Corolla leviter roseo-suffusa intense maculata circ. 1.8 cm. longa infundibuliformis extus lepidota intus puberula; limbus concavus 5-lobatus; lobi oblongo-ovales circ. 1 cm. longi 5 mm. lati. Stamina 10 inaequalia longiora corollam aequantia breviora circ. 1 cm. longa; filamenta basim versus puberula. Discus glaber. Gynaeceum circ. 2 cm. longum corollam paullo superans; ovarium circ. 3 mm. longum conoideum truncatum sulcatum dense lepidotum; stylus glaber sub stigmate discoideo recurvo vix ampliatus. Species Seriei Scabrifolii.

W. Yunnan. E. flank of the N'Maikha-Salween divide. 12–13,000 ft. Forrest **18,000.** May 1919.

A very distinct species. Narrow linear leaves setulose on margin only, upper and under surfaces smooth, hairless save for upper midrib where the hairs are vestigial—but very prominent in just expanding leaf. The margin is somewhat erose and prickly from the hairs and their bases. Here and there one larger than the others within the actual margin above. The scales are not sunk. The umbels in loose or dense fascicles. Calyx lepidote only outside and prominently bristly on margin. Small calyx.

Rhododendron tephropeplum, Balf. f. et Farrer.

Frutex parvus. Rami saepe stricti virgati erubescentes discontigue lepidoti, annotini circ. 2 mm. diam., vetustiores verruculosi. Folia petiolata ad 6.5 cm. longa; lamina crasse coriacea rigida lanceolata vel anguste oblonga vel oblongo-lanceolata vel oblanceolata ad 6 cm. longa vix 2 cm. lata, apice obtusa nunc subacuta mucrone prominulo rubro terminata, margine straminea paullo recurva obscure undulata, basi cuneata vel obtusa; supra pallide olivacea squamis scintillantibus demum plus minusve nigricantibus discontiguis (in quoque mm. quadr. circ. 6) induta, costa media sulcata glabra, venis primariis occultis; subtus fere nigro-cinerea papillis epidermicis ceriferis cinereis tecta et squamis uniformibus nigricantibus discontiguis (in quoque mm. quadr. circ. 12) vestita, costa media straminea vel erubescente elevata nigro-lepidota, venis caeteris occultis; petiolus circ. 5 mm. longus dense nigro-lepidotus. Umbellae terminales ad 5-florae; bracteae deciduae; bracteolae circ. 1 cm. longae filiformes a basi pilosae pilo-cristatae; pedicelli validi circ. 1 cm. longi erecti stricti purpurei squamis aurantiaco-scintillantibus dense vestiti. Calyx subfoliaceus 5-partitus ad 8 mm. longus; cupula dense lepidota; lobi submembranacei ovales vel rotundati pallide virides vel rubri plus minusve cero-glauci extus squamis scintillantibus lepidoti nunc fere elepidoti, margine squamiciliati et in lobos rubros nunc minute eroso-denticulati setisque sparsis ornati. Corolla late infundibuliformis ad 2.5 cm. longa kermesino-rosea; tubus intensius coloratus latus basi circ. 4 mm. diam. intus extusque glaber superne ampliatus basi calyce patente cinctus; lobi 5 tubum aequantes lati rotundati circ. 1.2 cm. diam. profunde emarginati. Stamina 10 inaequalia corolla breviora, longiora circ. 2.3 cm. longa, breviora circ. 1.5 cm.; filamenta subcarnosula infra medium fere ad basim puberula; antherae parvulae circ. 1 mm. diam. profunde bilobae. Discus dense puberulus. Gynaeceum corollam aequans vel ea paullo longius; ovarium 4 mm. longum conoideum profunde sulcatum

imbricatim dense lepidotum; stylus basi leviter lepidotus sub stigmate discoideo lobulato paullo incrassatus.

N.E. Upper Burma. Chawchi Pass, Maguchi Pass, etc. Alt. 10,500. A small bush of opener places. Flowers vivid magenta-rose. Very abundant on rocks and cliffs, forming wide and often procumbent masses. Very profuse with scentless flowers of bright carmine-rose with crimson-purple tube. Farrer **1567.** May 20, 1920.

N.W. Yunnan.

A species remarkable for the ash-grey coloration of the under leaf-surface brought about by the combination of black scales and the grey-white coating of wax-bearing papillae. Only seen elsewhere so far in *Rh. spodopeplum*, Balf. f. et Farrer. The flowers and their disposition recall the Brachyanthum phylum of the Campylogynum Series in some degree—in the umbels and in the calyx—but the stamens are very different and the gynaeceum has a long not deflexed style. True these features of the stamens and carpels appear in *Rh. aureum*, Franch. another of the Campylogynum Series and this may be the affinity. In any case the form is an interesting one and quite new. Noteworthy is the ovary which is not truncate at top but tapers into the lepidote style as it does in *Rh. aureum* also. The deep grooving of the ovary is very prominent and the carpels readily separate one from the other.

Rhododendron torquatum, Balf. f. et Farrer.

Frutex late patens ad 1 m. altus. Rami nodulosi in juventute indumento albo piloso adpresso praediti, annotini circ. 3 mm. diam. indumenti vestigiis notati. Perulae fugitivae. Folia petiolata ad 6 cm. longa; lamina coriacea ovalis vel obovalis ad 5.5 cm. longa 2.5 cm. lata, apice late obtusa rarius rotundata tuberculato-mucronata, margine cartilaginea rubra paullo recurva; basi obtusa; supra atro-viridis nunc purpurascens glabra rarissime indumenti albi arachnoidei detersilis vestigiis notata, costa media sulcata, venis primariis utrinsecus circ. 10 pinnatim patentibus impressis; subtus initio alba dein nunc cinerea, costa media elevata rubra et venis primariis plerumque indumento occultis nunc prominulis rubris, superficie generali indumento albo bistrato minute alveolato et scintillante persistente vestita; petiolus circ. 5 mm. longus ruber ut rami vestitus. Flores in umbellas ad 4-floras distributi; pedicelli ad 2.5 cm. longi validi plus minusve setuloso-glandulosi et floccosi sub calyce incrassati. Calyx ad 1 cm. longus; cupula dense glandulosa circ. 2 mm. longa atro-kermesina; limbus laete ruber carnosulus circ. 8 mm. longus inaequaliter 5-lobatus dorso glaber margine floccosus ad maturitatem reflexus et cum corolla (vel corolla delapsa) demum

deciduus. Corolla calyce torquata tubuloso-campanulata 3.5 cm. longa vel ultra coccinea intus septis incompletis notata et basi 5-gibbosa sacculis paullo intensius coloratis. Stamina 10 circum stylum aggregata paullo inaequalia, longiora circ. 2 cm. longa, breviora 1.5 cm.; filamenta puberula. Discus sparsim puberulus. Gynaeceum circ. 3 cm. longum corolla paullo brevius; ovarium petasiforme 3 mm. longum sulcatum truncatum pilis fasciatis flavidis et setulis glandulis paucioribus dense vestitum; stylus validus basi glandulis setulosis et pilis floccosis paucis praeditus; stigma subdiscoideum. Species Seriei **Sanguinei.**

N.E. Upper Burma. Maguchi Pass. Alt. 11–12,000 ft A broad spreading bush of 2 4 ft. abundant in the upper alpine region of the Maguchi Pass but seen nowhere else. Flowers variable in many shades of salmon and scarlet. Leaf reverse usually white but often of a dirty dark ash colour. Pedicels glandular. Fleshy corolloid calyx-process very conspicuous in the same colour as the flowers. This is no true calyx however since when the corolla falls this also after lingering a little comes off too in separate portions like deciduous petals. See also Farrer 1669, 1683. *Rh. cuchroo* valde affine sed basi cupulari inter alia distinguendum. Farrer No. **1775.** July 31, 1920.

A true member of the Sanguineum Series and of the phylum of *Rh. sanguineum* itself. Indeed *Rh. sanguineum* seems to be its nearest ally but may be distinguished by its crustaceous unistrate indumentum; its floccose non-glandular indumentum on the pedicels; its much smaller reflexing calyx which never forms the conspicuous collar as it does in *Rh. torquatum* thereby giving its name; its glabrous not puberulous stamens; its ovary without glands and its always glabrous style. The style glandular at base is a peculiar feature here.

Rh. cuchroum with which Mr Farrer seeks affinity is a very different plant and of the Series of Haematodes.

Rhododendron trichopodum, Balf. f. et Forrest.

Frutex ad 2.5 m. altus. Ramuli tenues, annotini ad 2 mm. diam. puberuli sparsim lepidoti leviter rubro-tincti. Folia petiolata ad 5.5 cm. longa; lamina subcoriacea ovalis ad 4 cm. longa 2.5 cm. lata, apice rotundata nunc retusa mucrone parvo terminata, margine cartilaginea vix recurva, basi late obtusa vel rotundata interdum subcordulata; supra subnitida olivacea granulosa elepidota, costa media haud sulcata flavida vel suberubescente basim versus puberula, venis primariis utrinsecus ad 10 pinnatim patulis basi paullo elevatis; subtus fulvida dense discontigue (in juvenilibus squamae imbricatae sunt) lepidota spatiis intersquameis viridibus quam diametrum squamarum minoribus,

squamis subimpressis circ. 10–14 spatium quidque quadratum 1 mm. diam. obducentibus rufescentibus resinoso-infiltratis scintillantibus annulo intensius colorato et instita pallida umbonem convexum cingente notatis, costa media elevata flavida glaberrima, venis primariis obscuris; petiolus erubescens circ. 1.5 cm. longus sulcatus ubique puberulus et lepidotus. Flores in umbellas 4 6-floras dispositi; bracteae bracteolaeque mox deciduae; pedicelli stricti circ. 1.5 cm. longi subpurpurascentes glauci sparse lepidoti basi plus minusve puberuli sub flore expansi ibique densius lepidoti. Calyx cupuliformis parvus circ. 1.5 mm. longus; cupula dense lepidota; limbus cupulam aequans submembranaceus 5-lobus vel undulatus squamo-fimbriatus. Corolla rosea emaculata ad 2.5 cm. longa infundibuliformi-campanulata paullo zygomorpha extus glabra intus copiose puberula sursum in limbum 5-lobum late patentem ampliata; lobi elliptici undulati vel crenulati vel emarginati circ. 1.5 cm. longi 1.3 cm. lati. Stamina 10 inaequalia corolla paullo breviora; filamenta valida deorsum dilatata et puberula. Discus sub ovario dense puberulus. Gynaeceum circ. 2.8 cm. longum corollam excedens; ovarium conoideum sulcatum truncatum dense lepidotum circ. 3 mm. longum, stylus glaber sub stigmate discoideo lobulato paullo ampliatus; Species Seriei Triflori.

S.E. Tibet: Tsarong. Doker-la. Alt. 11,000 ft. Forrest **14,341.** July 1917.

Note: —Puberulous twigs and petioles and midrib on upper side towards base of leaf. Upper leaf-surface elepidote. Midrib below without scales or hairs. Scales of underleaf subimpressed intervals green mostly less than diameter of scales. Leaf-base often becoming cordulate but mostly broadly obtuse. Leaf-apex rounded. Shape oval. Flowers small emaculate. Corolla very puberulous inside.

Rhododendron vicinum, Balf. f. et Forrest.

Frutex fragrans ad 8 m. altus. Rami crassi, annotini circ. 4 mm. diam. helvoli indumento molli persistente demum nigricante induti. Alabastra ovoidea sursum attenuata; perulae extimae ovatae caudatae (cauda recurva) pilis plus minusve rufescentibus subtomentosae. Folia petiolata ad 8 cm. longa; lamina crasse coriacea rigida oblongo-ovalis ad 7 cm. longa 3 cm. lata sursum attenuata, acuta vel breviter acuminata mucrone parvo terminata, margine paullo recurva, basi obtusa nunc rotundata; supra brunneo-viridis opaca vel subnitida minute reticulata glabrescens sed pilorum praeteritorum vestigiis obscure notata, costa media sulcata pilis siccis plus minusve impleta, venis primariis utrinsecus circ. 12 paullo impressis; subtus helvola ubique indumento subvariolato laevi persistente e pilis

rosulatis breviter ramosis et longi-ramosis aedificato vestita superficie plus minusve agglutinata nec favosa, costa media prominula, venis primariis obscuris; petiolus circ. 1 cm. longus ut rami vestitus. Flores in umbellas breviter ramosas plurifloras aggregati rhachi circ. 1 cm. longa puberula; bracteae bracteolaeque mox deciduae; pedicelli tenues stricti ad 1.5 cm. longi puberuli et floccosi. Calyx kermesinus parvus ultra 1 mm. longus cupuliformis; cupula glabra; lobi cupula longiores patentes margine dense rufo-ciliati. Corolla oblique campanulata postice circ. 3.7 cm. longa antice circ. 3 cm. alba extus leviter roseo-suffusa intus postice kermesino-maculata extus glabra; tubus basi sparsim puberulus; lobi 5 rotundati circ. 1 cm. longi 1.5 cm. lati. Stamina 10 brevia corolla multo breviora, longiora circ. 2 cm. longa, breviora 1.5 cm.; filamenta deorsum dilatata puberula. Discus puberulus. Gynaeceum circ. 2.5 cm. longum corolla brevius staminibus longius; ovarium tenue circ. 4 mm. longum subcylindricum paullo curvatum sulcatum truncatum laeve pilis brevissimis sparsissimis irregulariter punctatum; stylus glaber tenuis vix sub stigmate parvo lobulato expansus. Species ex affinitate *Rh.sigillati,* Balf. f. et Forrest.

N.W. Yunnan. Bei-ma-shan. Lat. 28° 12′ N. 12–13,000 ft. Forming forests. Shrub of 20–25 ft. Flowers white washed rose, exterior with crimson markings. Forrest **14,024.** June 1917.

This species represents on Bei-ma-shan the Mekong-Salween *Rh. sigillatum,* Balf. f. et Forrest. A much larger plant than that, more fragrant and with smaller pointed narrower leaves, leaves not so glossy above as in *Rh. sigillatum.* There are minor differences. Note the calyx wants the large lobe so marked in *Rh. sigillatum*—and the ovary is differently punctate. The underleaf indumentum hairs are like but not quite the same.

Two New West African Ceropegias.

In 1920 Dr J. M. Dalziel, Medical Officer, Lagos, presented the Royal Botanic Garden with tubers of *Ceropegia* which he believed to be those of *C. Dalzielii,* N. E. Br. (Kew Bull. 1913, p. 302). When cultivated it was observed at an early stage by Mr L. Stewart that there was more than one species concerned, although the tubers were much alike. This was confirmed when the plants flowered. Both belong to a small group of African Ceropegias which includes *C. campanulata,* G. Don, and *C. Dalzielii,* N. E. Br. But they are quite distinct from these species and from each other. I have had the opportunity of examining the type of *C. Dalzielii* through the kindness of the Director of Kew. Both species are more closely allied to *C. Dalzielii* than to any other of the group. Descriptions of the two are given herewith.

Ceropegia porphyrotricha, W. W. Sm. Sp. nov.

Species affinis *C. Dalzielii,* N. E. Br., a qua foliis ad 1 cm. latis haud glabris, nunc duobus tantum magnis, nunc paribus duobus vel tribus magnis, ceteris multo reductis, corollae tubo basi paululo inflato, apice anguste infundibuliformi, et 1 cm. diametro, extra minute puberulo, lobis intra nigropilosis atque paulo supra basim pilis purpureis bacilliformibus dependentibus valde mobilibus ornatis, inter alia signa divergit.

Herba perennis tuberosa. Tuber pro planta magnum late discoideum. Caulis erectus simplex circ. 30 cm. altus, vix 2 mm. crassus, sat dense pilosulus. Folia mediana duo opposita petiolo circ. 1 mm. longo pilosulo suffulta; lamina circ. 8 cm. longa, ad 1 cm. lata, plus minusve lineari-oblonga, apice acuta atque submucronata, supra densiuscule pilosula, marginibus et subtus ad costam bene pilosula, ceterum sparsim; super atque infer folia mediana oriuntur duo vel tria paria foliorum reductorum 3–4 mm. longorum lineari-lanceolatorum vel subulatorum. Flores

pauci erecti terminales vel laterales saepe solitarii. Pedunculi ad 2 cm. longi sparsim pilosuli. Sepala circ. 4 mm. longa subulata pilosula. Corollae tubus rectus 5–7.5 cm. longus, basi leviter inflatus circ. 4 mm. diametro, deinde anguste cylindricus 2 mm. diametro, apice paulo infundibulari-dilatatus 5 mm. diametro vix superans, extra pilis parvis bene conspersus, inferne dilute purpureus supra purpure saturato maculatus; lobi 5–6 cm. longi erecti apice connati e basi latiuscula anguste lineares brunneo-virides intra pilis nigro purpureis bene conspersi, erga basim pilis majoribus bacilliformibus pendulis purpureis decorati. Corona exterior cupularis 10-dentata dentibus circ. 1 mm. longis anguste triangularibus purpureis apice pilis albis longis paucis ornatis; corona interior 5-lobata lobis ligulatis circ. 3 mm. longis purpureis. Gynostemium breve; antherae erectae oblongae; stylus brevissimus truncatus.

West Africa. Cultivated from tubers collected by Dr J. M. Dalziel in 1920 near Tamala, the capital of the Northern Territories of Gold Coast. Lat. 9°–10° N. In a very dry parched soil over rock—soil rather sandy. Flowered June 1921.

A species well distinguished by one pair of leaves much larger than the others, by the very long corolla tube and lobes, by the small degree of inflation of the base of the tube, and by the peculiar pendent dark purple hairs fringing the base of the lobes on the inner side.

Ceropegia tamalensis, W. W. Sm. Sp. nov.

Species affinis *C. Dalzielii*, N. E. Br., a qua foliis latioribus ad costam marginesque pilosulis, corollae tubo diverso, lobis praelongis ex toto glabris praeter alia signa recedit.

Herba perennis tuberosa. Tuber pro planta magnum late discoideum ei speciei precedentis simillimum. Caulis erectus simplex vel subsimplex circ. 20 cm. altus, vix 2 mm. crassus, plus minusve pilosulus. Folia plerumque supra medio orta 2–3 paria petiolo fere nullo; lamina 5–8 cm. longa, 4–9 mm. lata, plus minusve lineari-oblonga, sensim acuminata, ad costam marginesque pilosula ceterum glabra vel subglabra. Flores pauci erecti terminales vel laterales vulgo solitarii. Pedunculi ad 1 cm. longi pilosuli. Sepala circ. 5 mm. longa subulata sparsim pilosula. Corollae tubus rectus 5 cm. longus, in parte basali 2 cm. longa, 1 cm. lata inflatus, medio cylindricus 3 mm. latus, supra sensim ampliatus ad os 1.5 cm. latum, extra glaberrimus basi viridis purpureo-striatus, supra maculis magnis purpureis decoratus, intus basi glaber saturate purpureus, supra pulchre purpureo-maculatus atque praesertim ad costulas quinque pilis longis atropurpureis conspersus; os tubi in plicas quinque suborbiculares convolutum;

plicarum margines exteriores in mucronem 1 mm. longum excurrentes, interiores in medio flore approximati sed haud connati, lobos corollinos praelongos gerentes; lobi ipsi 8–9 cm. longi lineares apice coaliti penduli ex toto glabri purpurei. Corona exterior cupularis 10-dentata, dentibus circ. 1 mm. longis triangularibus acutis pallido-viridibus glabris; corona interior 5-lobata, lobis ligulatis circ. 4 mm. longis erectis approximatis basi purpureis supra albidis. Gynostemium breve; antherae oblongae; stylus brevissimus truncatus.

West Africa :—Cultivated from tubers collected by Dr J. M. Dalziel in 1920 near Tamala, the capital of the Northern Territories of the Gold Coast. Lat. 9°–10° N. In a very dry parched soil over rock—soil rather sandy. Flowered June 1921.

This species is well marked in its group by the very long pendent corolla lobes which are quite glabrous and by the plicate arrangement of the mouth of the corolla tube.

W. W. SMITH.